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CLIMATE, WEATHER, AND DISEASE.

LONDON:
WILSON and OGILVY,
Skinner Street.

CLIMATE, WEATHER, AND DISEASE;

BEING A

Sketch of the Opinions

OF THE MOST

CELEBRATED ANTIENT AND MODERN WRITERS

WITH REGARD TO THE

INFLUENCE OF CLIMATE AND WEATHER IN PRODUCING DISEASE.

BY

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DOMI NUS ILLU MINA TIO MEA

TO

GEORGE GRAHAM, Esq.

REGISTRAR-GENERAL, &c.

This Work

IS RESPECTFULLY DEDICATED

BY

THE AUTHOR.

PREFACE.

It will be the endeavour of the author in the following pages to present to the student some of the more remarkable facts, that prove the dependence of many diseases, for their origin and continuance, on certain meteoric phenomena; and to point out any resemblance or difference that may subsist between the opinions, which physicians of the present age hold, and those that were entertained by the earliest writers on the subject.

In carrying out this plan, the reader will have laid before him so many as possible of those valuable facts with regard to the rise, progress, and disappearance of epidemics, which the labours of the Registrar-General have succeeded in bringing to light; and in order to illustrate this part of the subject more fully, coloured maps have been appended, which at a glance reveal the progress of some of the most remarkable zymotic and other diseases.

BRIDGEWATER:

September, 1855.

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THE STUDY
OF
ANTIENT MEDICAL LITERATURE.

INTRODUCTORY REMARKS.

There are some minds that never will be contented with the mere exercise of the practical part of their profession. Many such love to indulge their mental appetites upon the rarer fruits of literature; and although not regardless of what is essentially necessary, yet they cannot help confessing that they find immense enjoyment in allowing their thoughts to wander back into the realms of classic lore, and cull from the writings of elegant authors, observations and expressions which have received their polish from master minds. The bark or the wood we use certainly may be the only parts of a tree that we require in medicine; yet we should not neglect to study the leaves and the flowers that produce them. The practical dissertations of the day may contain all that is essential to inform the student of the nature and treatment of diseases; but certainly this is no reason why he should neglect to cultivate a more intimate knowledge of the history of medicine. Researches into the works of antient writers may be condemned as unnecessary, because we have all that we desire to know for our daily routine in the compilations of the day; but assuredly to be so contented is to deprive ourselves of a great source of pleasure, and to avoid a gymnasium whose healthy exercises would invigorate and freshen up our minds. Every man should endeavour as much as possible to use his own judgment in matters with which he is concerned, else is he often obliged to pin his faith upon the dicta of others, of which the more enlarged the mind becomes by study, the more does it become intolerant.

It is true that many learned and ingenious men have from their vast research and experience come to certain conclusions, and defined certain laws, which ages will never be able to controvert; but this is no more a reason why we should not tread over the same ground again through which they have journeyed, than that we should be contented with an epitome of the maxims of Holy Writ, without thoroughly searching the Scriptures for ourselves. Maxims and principles are all very well, and must be known; but we may depend that they are more thoroughly engrafted in our minds by numerous illustrations than by any other means:—without illustration, a series of maxims become wearisome; the mere detail of signs and symptoms in disease would become equally so to the student. No one, I think, will be bold enough to deny its utility in religion and science; the Bible abounds in it, and therefore it ought to be read thoroughly; and as in Medicine the works of Hippocrates and other classical authors are scattered over with observations made by men of enlarged mental capacity, so ought they to be consulted by all who would have something more than a mere rote-knowledge of their science.

Whether we study law, physic, or divinity, we have rich mines of antient information; and few men who have signalised themselves by the efforts of their brains in either of those professions, have neglected to avail themselves of these sources of mental wealth. With all its charms, and with all the advantages attending its culture, we are inclined to think that the study of the antient literature of medicine is in the present age too much neglected, both in our schools and by the profession at large. Why Medicine should fail, among the majority of its professors, to create a thirst for a knowledge of its history, is certainly remarkable, when we consider how many noble monuments remain, which, were they the supporters of any other science or art, would ensure for themselves multitudes of admirers. We cannot but admire the taste that creates a delight in the reader of the antient Greek tragedies: the scholar, whilst enjoying his intellectual feast, is carried back many hundreds of years,—lives, for the time being, as a spectator of the life-like drama before him; and whilst contemplating the characters of a departed age, reflects upon the striking likeness that obtains between the present and the past; for he finds that mankind has ever been the same,—that love and virtue had the self-same difficulties to contend against as now, that deceit and vice were often the means of worldly prosperity, and that even among the heathen, unenlightened by true religion, there still existed a proper appreciation of right and wrong. Thus linking the hoary past with the ever-budding present, he finds that the chain of human events is still the same wherever it can be traced, and that the history of our ancestry is only an anticipation of our own, if we take it in its grand outline, and analyse the remote causes of events in all ages by a reference to those passions which will ever be found to regulate man's actions. What has been preserved for us of the speeches of the Greek and Roman orators still claims the attention of those who would make eloquence their study. Demosthenes, Cicero, and others not less worthy of earthly immortality, are still models in the scholar's estimation, although they may be disregarded by thousands who think themselves perfect in elocution when addressing a constituency or a box of jurymen.

"Satis loquentiæ, sapientiæ parum."

With all our devotion to the literature of Antient Medicine, we must concede that it is not necessary for a man to study either Cicero or Demosthenes to be a good orator, or Hippocrates to be a successful physician; for we well know that there have been hundreds of excellent physicians, legislators, architects, and orators, who were ignorant of all that was written by those who excelled as such in Greece and Italy. At the same time, however, that we make this concession, we must assert that, had these excellent modern professors studied the works of those who were pre-eminent before them, they would have excelled still more, and, moreover, in some instances would have borne their laurels with less arrogance and pride, for they would have seen that their knowledge, however little they might have imagined it to be so, was still borrowed, and their information culled, from sources that they knew not nor thought of. Constituted as Medicine is now, it would be absurd to suppose that a medical man ought to depend solely on the founders of medicine, or that he ought to devote too much time to the study of their works. To peruse them, however, and blend their truths with the advanced state of modern knowledge, will ever prove of immense use in the cultivation of the mind: "quamvis non faciant medicum, aptiorem tamen medicinæ reddunt."

THE STUDY OF CLIMATOLOGY.

In studying Climate we study man; for in tracing its effects in all their variety on the human frame and mind, we make ourselves acquainted with his laws, customs, psychical and physical capabilities, vices, virtues, and all that appertains to that protean animal. We find it in one region depressing, and in another elevating his various attributes: here it seems to endue his person with capacity for excessive delight, there it blunts his nerves and reduces his psychical sensibility; in one region is it an element in the cause of slavery, in another does it invigorate man, and stimulate him to stand up for his own freedom, and to obtain redress for others. In an analysis of its power, we are struck with the relation that it bears to the diseases and morals of nations: with the former from the earliest periods has it been associated, and the great Hippocrates drew a graphic description of its influence in moulding the latter. But to follow climate through all its innumerable effects on man would be to attempt his history, to trace the progress of his mind, and to show how the arts, sciences, ethics, religion, war, and servitude have been regulated by it,—in fact, to write everything that we know about him. No author has given more than a scanty outline of this comprehensive subject: a skeleton picture, that has never been filled up, is all, perhaps, that it will ever be. The greatness, however, of the undertaking must not deter the reflecting student from entering the arena: the least fact will be acceptable, for it is alone by such means that we may hope to fill up the gigantic void. The climatic laws that regulate or seem to influence the features and growth of man in different latitudes, is a subject fraught with interest and difficulty; and it is only when we regard the vastness of the subject that we feel convinced how few our chances are of ever being able to grasp it. To know that perfection cannot be attained never acts as a log to the enlightened inquirer, who ever is found from age to age pursuing his investigations, and feeling contented and well rewarded if he can only add his mite to the treasures of science. "Hope springs eternal in the human breast," and buoys up the philosopher through all the tedium of research, inspiring him with the dream that he may yet discover something which will bring him nearer the goal that his predecessors have failed to reach.

From the ephemeral change that takes place in the persons of individuals on account of the diurnal variations in the weather, to the indelible mark estamped upon large families by the permanent climatic influence under which they have lived for a lengthened period, there is a chain of phenomena so long that it is impossible for us to view all its links at once: many are evident, and have been long observed, whilst others probably will for ever remain hidden, like the subterraneous courses of those vast rivers, which lose themselves in the trackless desert. Let us, however, study those phenomena that are within our reach; let us group them together, and perchance we shall be able to make use of, for our benefit, what the Divine Author of all evident and hidden things has allowed us to observe for our good. Let us not worry ourselves because we cannot know all, but let contentment ever tranquillise the true philosophic mind, and lead it to make the most of what it has; and if it be permitted to add an atom more to the treasures of science, let it be grateful, and not allow itself to forget the purposes of such a grant.

From the most remote period of the history of this earth, we find that animated nature has always been more or less subject to external agencies, whether atmospheric or otherwise; although Sir Roderick Murchison has remarked, that during the formation of the silurian rocks there was but little, if any, difference between the species of mollusks that inhabited the seas that once flowed over the site of the Alleghany Mountains, the hills of Herefordshire, and that which covered the land where now the Ural Mountains rear themselves into the barriers that separate Europe from Asia; for in the upper silurian the brachiopod, the trilobite, and the orthoceratite (cephalopod) are uniformly distributed, and are the characteristic fossils of this formation, wherever it may be found. In explanation of this uniformity of life in the primeval seas, it has been suggested "that there might have been a greater uniformity of temperature resulting from the as yet unspent heat of the surface, arising from internal incandescence; at the same time the same author thinks that the more probable cause was the comparative newness of life upon earth, and its little experience of those external agencies by which it is liable to be affected, and which we shall see reason to believe have conduced to the production of the many shades of variation which now mark the organic kingdom."* Such an uniformity affords a strong contrast to what now obtains both in the animal and vegetable life of this globe. How one continent differs from another in its fauna! and in the case of man, how strange a contrast is brought about by the metamorphosing power of climate! How great are the changes effected by heat and cold; and how, in exalting and depressing the sensitiveness of man's nature, do these prominent climatic agents draw the line between man and man! "Comme on distingue les climats par les dégrés de latitude, on pourroit distinguer, pour ainsi dire, par les dégrés de sensibilité," wrote Montesquieu.† Could a man be suddenly transported from the snowy pole to the glowing zone, what strange emotions would arise on beholding the immense contrast! Assuredly would he think, had he not witnessed the gradations betwixt these extremes, that he had been wafted to another world; for how could he in his ignorance reconcile the gorgeous colours of the plants, insects, and animals of the zone—its cloudless sky, its glowing sun, the perfume of the flowers in the air, and the activity of life—with the dull, grey, monotonous north, where vegetation is at its lowest ebb, and man with his attendant animals slow, blunted, and benumbed? Yet such a contrast would he behold, and such is the effect of climate. But with all this vast difference, the inhabitant of one region envies not his remote brother. The Esquimaux would not change with the Indian, for each is adapted to his peculiar circumstances; and so perfect is the harmony of nature, that general discontent against the Great Disposer has no existence in the minds of his creatures, whom He has distributed as it seemed best to Him, and whom He has made to feel a kind of happiness in their lot, which unanswerably proves His infinite benevolence.

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* Vestiges of the Creation, 10th ed. pp. 42-43.

† Œuvres Compl. de Montesquieu, p. 301 a.

HIPPOCRATES.

Hippocrates was an original observer, and throughout his works, especially those that we are about to discuss, he is careful to give his readers the full result of his experience, without troubling them much with theory. The student is therefore left to himself to compare what was written two thousand two hundred years ago with what daily passes under his own eyes; and it will not be a fruitless task for him to take Hippocrates as his text, and unravel the connection that obtains between the results of modern investigation and these antient monuments of a mind whose just appreciation of nature in all her different forms led him to watch her narrowly, and make the knowledge that accrued to him from this contemplation subservient to the grand duty of his life,—the advancement of medicine. He travelled through different regions, and as he wandered accumulated knowledge of persons, places, and things: at once did his keen eye perceive the changes that climate produces in the human race. Like Prichard of the present century, he accounted for the physical difference among nations by connecting them with certain climatic influences: he saw that diseases assumed different forms under varied circumstances. Everything connected with life inspired him with a deep interest. With his profession ever before him, he laboured throughout a long career to make it as perfect as was possible. To benefit man was to him a clear duty, and he never rested content whilst any phenomenon of nature that might tend to throw light upon his diseases remained unstudied, and therefore unapplied to man's use. As to whatever might have been observed in after ages, supposing Hippocrates had never lived, we can only say that even when this great author had pointed out to posterity so noble a course, very little was added to the stock of knowledge that he left as an inestimable legacy to succeeding generations; and it will be observed that throughout the bulky volumes of his commentators and translators, little fresh material was introduced, and even that little of inferior importance. To Hippocrates succeeded many theorists, and we all know that wherever theory abounds facts are scarce. In the present day one author writes a large book upon his favourite theory; and perhaps before the first edition of his work is sold, another equally voluminous writer strains every nerve to upset his predecessor. Such is the fate of theorists; their existence, except when they closely build upon fact—as Cuvier, Prichard, Grant, and Owen have done in our day—must necessarily be ephemeral. The book, however, that is filled with well-recorded facts, and some few obvious deductions from them, will always remain as a land-mark in literature; and on this account it is that we read, for instance, the Aphorisms of Hippocrates, and his remarks on meteorology and climate, with so much benefit, even at a time when the world was never more craving after novelty. The works of Hippocrates contain enough, if a selection were made, to occupy a student's attention at all periods of his career, and he will do well to remember what they have taught him; for at the bedside they will serve him, and in his study they will prove a prolific source of information.

APHORISMS AND STATISTICS.

In the writings of the early professors of medicine and philosophy, statistics, as we now receive the term, are not to be found; but their observations, which were generally made with much common sense, guided them to an approximation to the truth, which for practical purposes is eminently useful, although of course not so implicitly to be depended on as the result of accurate numerical calculation. These rough guesses, or rather statements, are in a most extraordinary manner borne out by the statistics of the present enlightened and accurate age: differences, however, there are between them, and they ought naturally to be expected, on comparing the observations made on the north coast of the Mediterranean and the results of the investigations carried on in our own isles and colonies,—for climate is the grand modifier of disease; and as its influence is universal, so must we expect to find that in the direct ratio of its modifications are the variations that will obtain in all nosometrical tables that include extensive regions.

The aphorisms of the antients are in their way still as useful, and perhaps ever will be so, as the numbers of the modern statistician; for many will remember them, whilst few will have memory sufficient to retain the array of figures that is to be met with in that valuable epitome of knowledge, the Registrar-General's Reports. Most minds are ill constituted for the study of statistics, although the generality of persons are pleased with the result of a series of calculations, when statistics assume the aphoristic form. Men in general like anything that is short, pithy, and epigrammatic. The royal road to learning is still believed in, and many suppose that they have attained it; little thinking how important series of facts have been arrived at through the brains of others. It is very well to be able to say that more males than females die of a certain disease; but the route to such a fact is often wearisome and dark, and the superficial dabbler in science, without considering this, is often found pluming himself upon his borrowed knowledge, forgetful of the source whence he derived it, like the insignificant and brainless heir to a title gained by industry and talent.

The value of aphorisms is in the direct ratio of their general truth: exact correctness can hardly be expected. Statistics, therefore, have a certain advantage over them. For instance, a statement to the effect that to every hundred males so many females die, is more informing than the vague assertion that the mortality is greater among men than women, and after a little time equally well remembered.

The study of statistics has grown out of the crude observations of past ages, and, like a dutiful child, often reflects great lustre upon its parents. The more salient facts with regard to mortality and disease have long been known; but only now have they assumed that rigid truthfulness so characteristic of the age. Science, like man, is sportive, imaginative, impressionable in her youth; but grave, rigid, exact, and unpoetical in her maturity.

THE IATRO-METEOROLOGY OF HIPPOCRATES.

I SHALL now endeavour to give a brief outline of that branch of medical science which may with propriety be termed *Iatro-meteorology*, and show to those interested in studying it how the great Hippocrates anticipated them in their appreciation of its value as one of the helpmates of medicine. They will find in his writings, especially in his *Epidemics*, *Aphorisms*, and *Airs, Waters, and Places*, very many minute meteorological observations in connection with disease; and when we consider how deficient he was in those appliances which modern science has given to us to facilitate our pursuits, we cannot but acknowledge the consummate wisdom and foresight of one, who saw the relation between atmospheric change and disease more than two thousand years ago, and who, in the application of his knowledge, was nearly, if not quite, as advanced as our professors in the present day.

Hippocrates says, in the opening paragraph of his treatise *On Airs, Waters, and Places*:—"Whoever desires properly to investigate the art of medicine, must do this: first, take into consideration the seasons of the year, and how each is capable of operating (on the system); for they not only do not resemble each other, but differ widely the one from the other in the changes (they bring about). Then the cold and hot winds (must be noted), especially those that are common to all nations, and then those that are peculiar to any particular district."*

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* "Ἰητρικὴν ὅστις βούλεται ὀρθῶς ζητέειν, τά δε χρὴ ποιέειν· πρῶτον μὲν ἐνθυμέεσθαι τὰς ὥρας τοῦ ἔτεος, ὅτι δύναται ἀπεργάζεσθαι ἑκάστη· οὐ γὰρ ἐοίκασιν οὐθεν, ἀλλὰ πουλὺ διαφέρουτιν ἀυταί τε ἑωυτέων και ἐν τῆσι μεταβολῆσιν· ἔπειτα δὲ τὰ πνεύηατα τὰ θερμάτε καὶ τὰ ψυχρά· μάλιστα μὲν τὰ κοινὰ πᾶσιν ανθρωποισιν, ἔπειτα δὲ κὰι τὰ ἐν ἑκάστῃ χώρη επιχωρία ἐόντα."

Περὶ Ἀέρων, Ὑδάτων, Τόπων, ed. Kühn, vol. i. p. 523.

His mode of observation, which will be found in the first and third books of his *Epidemics*, was very simple: in these instances he gave a description of the seasons of three different years, particularised the peculiarities of each season, and then concluded with an account of the most remarkable diseases that prevailed during each. The assemblage of meteoric phenomena observed during the year, he comprised under the term *καταστασις*, which is equivalent to "*the state*" or "*constitution*" *of the seasons*, *τῶν ὁρέων*.

I will proceed at once to give a short detail of these observations, and for the sake of easy reference will place them in a tabular form (*see* opposite page).

First Constitution.—The observations grouped within the first three tables were made at Thasos, now Tasso, N. lat. 40° 30′, E. long. 24° 28′, a small island in the north of the Grecian Archipelago (the Ægean Sea), on the coast of Thracia, now Roumelia, in the south of Turkey. It was remarkable for its fertility, insomuch that it became proverbial. The people were much addicted to both drinking and venery. Geologically considered, the island is composed of pure white marble, and has mines of gold and silver; and with regard to its meteorological position, according to A. Petermann, it is situated about the isothermal line of 58° Fahr. average mean annual temperature. The same author places it in a central position in relation to the northern and southern limits of the cultivation of the vine, for which it has ever been celebrated; and Virgil, in giving an account of the cultivation of the vine in his second book of the Georgics, mentions the Thasian vines as being more adapted for a light soil than some others,—for instance, the vine of Mareotis, a lake in Egypt.

> "Sunt Thasiæ vites, sunt et Mareotides albæ
> Pinguibus hæ terris habiles, levioribus illæ."

FIRST CONSTITUTION. (Κατάστασις πρώτη.)—Observations made at Thasos. (Ἐν Θάσῳ.)*

Season.	Rain.	Wind.	Temperature.	Cloud.	Snow, etc.	Name of Diseases	Remarks, etc.
Autumn. (Φθινοπωρου περὶ ἰσημεριην καὶ ὑποπληΐαδα.) About the autumnal equinox and under the Pleiades.	A great deal of rain, which was constant and soft. ὕδατα πουλλὰ ξυνεκέα μαλθακῶς.	Southerly. ἐν νοτίοισι.				(*a*) Cynanche parotidea. Inflammation and pain of the testicles. Dry coughs. Hoarseness.	ἐπάρματα δὲ παρὰ τὰ ὦτα. φλεγμοναὶ μετ᾽ ὀδύνης ἔς ὄρχιν. πολλοισι δὲ βῆχες ξηραὶ. βήσσουσι καὶ οὐδὲν ἀνάγουσι. φωναὶ βραγχώδεες.
Winter. Χειμὼν. τὸ ξύνολον ἔς γε χειμῶνα ὁκοῖον ἦρ γίγνεται. The winter was on the whole very like spring.	Droughts. αὐχμοὶ.	Southerly. Slight north winds. χειμὼν νότιος, σμικρὰ πνεύματα βόρεια.				Cynanche, etc.	
Spring. Ἦρ.	Slight rain. σμικρὰ ὕσματα.	Spring southerly ἦρ νότιον.	Cool. ψυχινὸν.			(*b*) Fevers.	καῦσοι. Moderate, however, and unattended by any hæmorrhage. Never fatal.
Summer. Θέρος.	No rain. ἀνυδρίαι.	Etesian winds, rare, small, and irregular. Ἐτησίαι, ολίγα, σμικρὰ, διεσπαρμένως ἔπνευσαν.		Very cloudy. πουλὺ ἐπινεφέλον.		(*c*) Phthisis (acute). Phthisis (chronic). Fevers.	Those who had a predisposition to phthisis took to their bed. φθινώδεες κατακλίθησαν. (Remittent type of Munro?) πυρετοὶ πουλλοὶ ξυνεχέες.
Autumn.						Phthisis and fevers.	Phthisis fatal. The fevers were not so.

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* Hippocratis Opera omnia, ed. Kühn, vol. iii. p 382; Fœs. i. p. 938; Littré, t. ii. p. 598.

Galen says of Thasos (vol. xvii. A, p. 36, ed. Kühn), "That this island, being situated just opposite Thrace, is exposed to cold northerly winds." In the time of Hippocrates it was in a very flourishing condition, and a tributary to Athens; but it revolted, and threw off its subjection, when its former mistress became weakened by losses during the Peloponnesian war.

The various diseases, and their relation to the constitution of the year, must now be reviewed.

(*a*) *Cynanche parotidea; Parotitis; Specific Parotitis;* English, *Mumps,* which has its origin in the word *mum,* whose primary sense is *to close, to shut,* or *cover,*—the effect of the swelling of the parotid glands being to close the jaws, so as to make it difficult for the patient either to eat or speak,—he *mumbles;* French, *oreillons* and *ourles;* Scotch, *branks,* which seems to point out some connection between the disease and a frequent attendant upon it, *hoarseness,* mentioned here by Hippocrates—φωναὶ βραγχώδεες. The description here given is too characteristic of *mumps* to admit of a doubt as to its being the same disease that we now and then witness. During this season it was evidently *epidemic,* attacking adults and men, principally, who were assembled together in the Palæstra and Gymnasium: the women were less affected. We know how in modern times it often runs through schools, which with other facts proves its contagiousness; and, like most affections of this kind, it seldom attacks the same individual more than once in his life. Its metastasis to other organs, especially the testicle in the male, is here mentioned; but on account of the women being but little affected, we do not find that Hippocrates mentions that there were any cases of mammary tumour. Physicians of the present day have observed that a *cold* and *moist* state of the weather is conducive to this disease; and on reference to the table, we find that there was a great deal of rain during the season in which this disease was prevalent, and that it had been preceded by an opposite and *northerly* state. ἐκ τῆς πρόρθεν καταστάσιος ὑπεναντίης καὶ βορείου. As *mumps* is seldom, if ever, fatal except by metastasis to the brain or its membranes, we do not find it in the list of the causes of death in the Registrar-General's Report, so that we are unable to compare its statistics with the observations contained in Hippocrates.

Mumps have been observed to follow epidemic catarrh. This was the case in 1803, when influenza raged throughout England; for we find in Dr. Thompson's Annals of Influenza, a quotation from Mr. Goodwin, of Framlingham, to the effect that *mumps* both prevailed at the time of the epidemic catarrh, and was often one of its sequels. The meteorological phenomena of that year are recorded by Dr. Thompson (op. cit.): "North-east winds, fetid acrid fogs, Aurora borealis, sudden atmospheric changes, shocks of earthquake, excessive mortality among insects, and disease of cattle and domestic animals."

In the year 1779, mumps assumed an epidemic character in a village in France, and is thus recorded by M. Rossignoly, in his *Observations sur plusieurs fièvres d'une nature particulière*, Journal de Médecine, t. lxv. p. 188, 1785:—"Pendant l'automne de 1779 . . . les habitans de Pegomas, village qui sert presque de faubourg à la ville de Grasse, furent tout-à-coup attaqués par une fièvre qui, dès l'invasion, s'annonça d'une manière extraordinaire; la maladie commençait par un engorgement aux parotides et aux autres glandes salivaires. Cet état, très gênant pour la déglutition et la respiration, s'accroissait pendant quatre ou cinque jours avec un mouvement fébrile. Vers le sixième, l'engorgement se portait subitement aux testicules, où il s'établissait une inflammation, accompagnée de tuméfaction considérable, ce qui débarrassait entièrement le gosier. Cette metastase excitait un mouvement fébrile un peu plus marqué, mais cette fièvre n'était que symptomatique; car, au bout de quelques jours—c'est à dire, vers le septième ou le huitième de l'invasion de la maladie—les accidents secondaires se dissipaient, la fièvre tombait entièrement, et le jugement de la maladie était si complet, que les malades n'avaient besoin d'aucun remède, et se trouvent ainsi guéris d'une manière singulière par les seuls efforts de la nature. Mais ce qu'il y a de singulier, c'est qu'il n'y a eu que les *célibataires* qui aient été attaqués de cette maladie." M. Littré, who quotes the above passage, does not say whether M. Rossignoly subjoined to his statement an account of the coincident meteorological phenomena. With reference to the last fact, that the mumps only attacked *single men*, it must be remarked that Hippocrates (op. cit.) distinctly says that "they attacked lads, adults, and especially those engaged in the palæstra and gymnasium." We know that those who exercised in the Palæstra were generally youths, and probably single; on the other hand, the Gymnasium was more used by men who were training, and, as a general rule, *trainers* are, for the time being, "célibataires."

(*b*) *Fevers.*—This was evidently not a year favourable to the development of *fevers;* they were moderate, unattended by bleeding (from the nose), and were never fatal. We shall find in the sequel that Hippocrates considered that *droughty years* were most conducive to acute fevers. The constitution of this year could hardly be considered so; in fact, there seems to have been plenty of rain, with a southerly tendency in the wind during the preceding autumn, and although altogether a dry year, yet there was no drought, except during the winter.

(*c*) *Phthisis.*—*Consumption* was very fatal during this year; and it will be interesting to trace the relation borne by this dreadful disease to the constitution of a year in which it was so prominent a cause of death, and in doing so we must compare the opinions of modern physicians with the observations of Hippocrates, and the other great medical authorities of antiquity.

Hippocrates says *that the autumn is obnoxious to consumptive persons ;** to which Galen adds, in his commentary on this passage, "if it be *dry, cold,* and *unequal.*"† On reference to the table, we find that the summer in which the consumptive cases began to develope themselves was *dry*, the winds *irregular*, and the *sky overcast :* of the state of the weather during the succeeding *autumn* nothing is said. However, it appears that phthisis committed great ravages during both these seasons. In England we learn from the statistical returns that the *spring* is the most fatal to consumptive patients, whether male or female; but with regard to the other seasons there is considerable variability. For instance, suppose we take the seasons of 1838 in the order of their fatality to *males*, they would stand thus: *spring*, 1137; *winter*, 1048; *summer*, 968; *autumn*, 904. To females: *spring*, 972; *summer*, 937; *winter*, 896; *autumn*, 825. Then again, although the *spring* invariably takes the lead, the other seasons change places with each other from year to year; and what is remarkable, this inconstancy does not seem to be dependent upon temperature, as we shall presently see. In the returns for 1853, the following statistics on deaths from consumption appear:—*Winter*, 1872; *spring*, 1971; summer, 1745; autumn, 1914. The order of fatality in the years above quoted would therefore be—

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* Hipp. Op. om. ed. Kühn, Aph. sec. iii. x.

† Galeni Opera, ed. Kühn, vol. xvii. B. p. 577.

1838.	*Males.*	1, spring;	2, winter;	3, summer;	4, autumn.
,,	*Females.*	1, spring;	2, summer;	3, winter;	4, autumn.
1840.	*Total.*	1, spring;	2, winter;	3, summer;	4, autumn.
1853.	,,	1, spring;	2, autumn;	3, winter;	4, summer.

So far, therefore, as seasons are concerned, the above tables prove that *spring*—i. e. April, May, June—is the most inimical quarter to phthisical patients, and that probably *autumn*—October, November, and December—the least so. In London at least, if not throughout England generally, the *spring* is undoubtedly the most obnoxious to consumptive cases; and this statement is in accordance with the experience of those physicians who have opportunities of seeing the rise, progress, and end of many hundreds of phthisical cases during the year. Dr. Richard Quain observes "that the cold easterly wind of spring completes the work which the winter had left undone."

Temperature.—We have already alluded to the effect of temperature in consumptive cases. Its relation, however, to this disease requires something more than a mere passing notice.

On referring to the Table Nos. I. and II., which show at a glance the fluctuations in the mortality from diseases of the lungs, it will be observed that phthisis does not seem to be so much influenced by the increasing temperature of the year as the other two diseases, bronchitis and pneumonia. The constitution of the year under discussion seems to have been especially obnoxious to the organs of respiration. There had been a great deal of rain, and a northerly tendency in the wind, during the seasons previously to those grouped together under this First Constitution; and it may be conjectured that then the seeds of pulmonary diseases were sown, to be redeveloped during the succeeding unseasonable summer and autumn, in which, although they were *dry*, yet we find that the sky was overcast, and the Etesian winds were rare, small, and irregular: these winds have a northerly direction. Altogether, we may safely conclude that the *temperature* of this year was considerably below the average. It must be borne in mind, however, that probably the cases classed under phthisis by Hippocrates were not all genuine; for it is more than likely that he included many fatal cases of bronchitis, which, from the general *southerly* direction of the wind during the first autumn and the following winter and spring, may have prevailed especially in the chronic form, which a south-westerly wind is exceedingly prone to aggravate.* In genuine phthisis there can be no doubt that, as the temperature of the year rises, there is a slight declension in the amount of the mortality. Diseases that decline in the number of fatal cases as the temperature of the year increases —take, for instance, bronchitis and pneumonia—form a certain angle on the table whose apex is at the period of minimum mortality; and it will be found that the acuteness of the angle thus formed is in the direct ratio of the insusceptibility of the disease to be modified by temperature. Whilst pneumonia has an angle of declension of 23°, and bronchitis one of at least 41°, showing how much temperature has to do with these diseases, phthisis has only an angle of 13° for the year 1854, which equally well proves that its course is more steady, and less influenced by the rise in the mean temperature. The apex of the angle ought to be placed at the week in which the number of fatal cases from any disease is at the lowest, at the time when the mean temperature of the year is about its height; and whilst the lower leg of the angle is horizontal, the upper one is carried up to the week wherein the greatest mortality took place, either soon after or before the week in which the thermometer indicated the lowest mean temperature.* The following numbers will give some idea of the effect of temperature on the number of deaths from phthisis:—

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* See Table No. I.

The Year.	Annual Mean Temperature.	Number of Deaths.
1846	51°.3	6890
1852	50°.6	6935
1848	50°.2	6556
1849	49°.9	6317
1843	49°.4	7104
1851	49°.4	7027
1850	49°.3	6137
1847	49°·1	7010
1841	48°.7	7326
1842	48°.7	7145
1844	48°.6	7099
1840	47°.8	7236
1853	47°.7	7502
1845	47°.6	6731

The above tables give the following annual average for each of the five degrees:—

Annual Mean Temperature.	Average annual number of Deaths in London from Phthisis.
51°	6890
50°	6745
49°	6719
48°	7190
47°	7156

These tables certainly indicate a relation between the mean annual temperature and the mortality from phthisis in London;

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* For further illustration see the Notes on Tables I. and II.

a less number of deaths taking place at 51° than at 48° and 47° by $\frac{1}{28}$, although it will be seen that the number of deaths were greater when the temperature was 48° than when it was a degree lower, 47°; and the same obtains between the degrees 50° and 49°. We are inclined to think that other causes than temperature operated to bring about this apparent relation. Even the average daily range of the thermometer seems to have very little to do with this disease; for when in 1853 it was at its maximum, which occurred in spring and summer, the number of deaths was at its maximum and minimum.

Seasons, 1853.	Total number of Deaths.	Mean Weekly Temperature.	Average daily range of Thermometer.
Spring	1971	51°.8	18·2
Autumn.....................	1914	42°.3	13.7
Winter	1872	38°.1	11.5
Summer.....................	1745	58°.5	17.9

This table bears out the above observations, and tells us that phthisis was most and least fatal during those seasons in which the temperature was highest, and when the daily range of the thermometer was at its maximum.

Humidity and dryness of the air.—In the winter of this year there were *droughts*, and the succeeding seasons were *dry*. We have seen that Galen believes a *dry* air in autumn to be injurious to consumptive cases; and Hippocrates remarks, in Sec. 3, Aph. xvi. that phthisis is one of the diseases of *dry* seasons. Now in the year 1853 the greatest number of deaths took place during the two seasons when the *dryness* of the atmosphere was at its maximum and minimum, as the opposite table will prove. The moisture of the atmosphere is ascertained by the difference in the readings between the dry- and wet-bulb thermometer, and the amount of aqueous vapour suspended in the atmosphere is estimated according to the number of degrees which express this difference. For instance, suppose the dry-bulb thermometer stands at 50°, and the wet-bulb at 40°, the

1853.	Total number of Deaths.	Mean Dryness of the Air.
Spring	1971	8·1
Autumn	1914	2·6
Winter	1872	6·4
Summer	1745	6·9

temperature of the dew-point would be 30°, and the degree of humidity 0·495 (complete saturation = 1·000).* If the two thermometers exactly agree, complete saturation of the air is indicated. Moisture in the atmosphere has two effects upon the body, one general and the other local. With regard to the latter, it is well known that warm *moist* air is most congenial to irritable lungs; and acting upon this fact, Mr. Jeffreys contrived an apparatus, which, in the form of his well-known respirator, accords to the sufferers from phthisis and other diseases of the lungs what had long been a great desideratum before his inestimable invention, viz. a *portable climate*. In his Remarks on the Atmospheric Treatment of the Throat and Lungs, he observes :—" The action of the air is to dry and to cool (and in winter to chill) any warm and moist surface exposed to it, whether that surface be inanimate—as a towel dipped in warm water and hung in the air—or animate, as the living membranes in question. Such membranes, therefore, that they may bear this action of the air, are in health well provided with the means of supplying themselves with warmth and *moisture*, as fast as they are carried off by the air. Moderate exposure, then, is healthy and invigorating to all these membranes in their proper state; but directly they are delicate or irritable, they (especially the membranes of the eyes and lungs) cannot endure this action of the air without suffering; and the more they are exposed in this state, the more irritable and delicate they become. On the other hand, the more their natural warmth and *moisture* can be preserved, the sooner does their irritability subside, and their tone and vigour return." He then draws a parallel between the irritability of the mucous membrane of the eye, and that lining the bronchial tubes, and lays particular stress upon the difference between the local and the general application of heat and moisture. An atmosphere combining the two has a tendency to soften the irritable lining of the air-tubes, and prevents that drying process which is so detrimental to this highly sensitive membrane; whereas he justly observes that a climate so constituted would have generally an unwholesome effect upon the system, as it would necessarily impede the healthy action of the skin, and overtax thereby some internal organ, which state of things would react upon the lungs, and impose upon them extra duties at a time when they are but indifferently up to their own. Mr. Jeffreys's invention has been constructed for the purpose of what he calls a "portable climate;" and the experience of thousands will testify how admirably this simple but effective apparatus has succeeded. During the weeks of the greatest and least mortality from phthisis in the year 1854, we find that the air was, on the whole, dryer when this disease was most fatal.

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* "Hygrometrical Tables," by James Glaisher, Esq.

Thus for the Minimum					Maximum.			
Number of the week	11	19	27	38	13	17	25	36
Number of deaths...	128	128	111	110	162	169	153	152
Dryness of the air...	7·7	4·5	5·3	6·2	7·9	5·8	6·0	9·0

It is well known that the dryness of the air greatly depends upon the quarter whence the wind blows; and certainly from the following tables, it will be seen that there is, in all probability, not only a relation between the moisture and the wind, but also between the wind and the number of deaths which occur in any given week. It must, however, be borne in mind that the actual state of the wind for the week in which great mortality occurs, may not have so much to do with the increase in the number of deaths as that which prevailed during the week before, especially if it were between the points N and E.

Wind.—On glancing over the table of this First Constitution of Hippocrates, we find that the south wind prevailed until the

Etesian set in during the summer. The south wind has always been associated with moisture; and although, as a general rule, it does bring vast quantities of vapour from the tropics, yet it must be remarked, that during the winter, spring, and beginning of the summer, there was a drought, and but little rain in the winter afterwards. This *dryness*, with the *heat* of a southerly wind, most probably acted most injuriously in those cases where there was a predisposition to pulmonary disease; and we think we are justified in making this observation, when we take into consideration the list of diseases that Hippocrates has recorded as having occurred during this year. A south-west wind has evidently the effect of keeping alive many consumptive patients that a north-easterly wind would prove fatal to; and in order to show how much influence these two winds have upon the bills of mortality, as regards phthisis, we will place the statistics in tabular form.

The Weeks in which a remarkable Rise in the number of Deaths from Phthisis took place.

Number of the week, 1854...	8	13	17	20	21	25	28	36
Number of the deaths.........	154	162	169	148	149	153	151	152
Mean daily reading of the thermometer......	40·9	47·3	43·0	44·6	51·5	58·7	56·4	59·2
Mean daily reading of the barometer	30·096	30·124	29·944	29 989	29 555	29·885	29·702	30·166
Amount of dryness of the air	7·1	7·9	5·8	7·3	4·6	6·0	4·6	9·0
Mean direction of the wind...	NW	WSW*	N&NE†	NE	SW‡	SW§	NE·SW	NE

On referring to the table of deaths from pulmonary diseases for 1854, it will be seen that there is generally a depression in the number of deaths from phthisis after a week or two of great mortality. This might be due, either to the killing off by the NE winds, and their concomitant dry air, of the worst cases, or else to the preservative effects of the S and SW winds, which, with the increased moisture of the air, seem to accord to these poor sufferers an extension of their existence, until their benign influence is checked by a change in the weather.

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* The week previous to this had several days during which a NE wind prevailed, and its mean dryness was 5·1.

† The 16th week had an E wind throughout.

‡ The preceding week will be seen to have had a NE wind.

§ An E and ENE prevailed for two days in the week previous.

The Weeks in which a remarkable Fall in the number of Deaths from Phthisis took place.

Number of the week, 1854...	11	19	27	38
Number of deaths	128	128	111	110
Mean daily reading of thermometer........................	47·2	49·7	56·9	51·1
Mean daily reading of barometer	29·997	29·748	29·618	29·972
Amount of dryness of air ...	7·7	4·5	5·3	6·2
Direction of wind	SSW*	SW†	SW‡	SW§

We believe that the above facts are in accordance with the experience of most physicians; and it must be acknowledged that in the treatment of a disease unfortunately so common in our country, every circumstance that seems either to mitigate or aggravate it ought to be well known; for without such a knowledge it will ever be impossible to treat phthisis scientifically.

With regard to the form of phthisis that prevailed during this constitution, it may be well to remark that many are of opinion that it bore a striking resemblance to the acute form described by Louis: the semitertian character of the fever (*ὁ δε τρόπος ἡμιτριταῖος*) that so frequently accompanies the invasion of this disease has often misled practitioners, who have not paid enough attention to the signs revealed by the stethoscope. Then again there was the painful and vascular state of the fauces

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* A SW wind prevailed every day except Sunday during the previous week.

† A SW wind blew throughout every day of the week preceding.

‡ The wind had a southerly direction during the greater part of week 26.

§ The preceding week, No. 37, was characterised by a SW wind.

(*φάρυγγες δε τοισι πλείστοισι τούτων ἐξ ἀρχῆς καὶ διὰ τέλεος ἐπώδυνον εἶχον. ἔρευθος μεταφλεγμονῆς*), and lastly, the delirium that preceded death (*καὶ παρύληροι πουλλοὶ περὶ θάνατον*),* all of which are features that justify us in entertaining the opinion of Dr. Adams, who has bestowed so much labour upon the works of Hippocrates. Hippocrates mentions in this place that there were three classes of patients who suffered from the constitution: 1st, those who were decidedly consumptive; 2nd, those in whom there was a phthisical tendency; and 3rd, those in whom this disease commenced for the first time. In respect of the latter, no distinct season seems to have been indicated in which consumption was most prone to show itself; it would, however, be very desirable to ascertain what time of the year is really most favourable to the invasion of a disease that is so fatal to our countrymen; for, were the meteorological condition of the atmosphere most obnoxious to persons of a consumptive tendency well known, a prophylactic mode of treatment might be adopted which perchance would have the effect of carrying many hundreds over the most trying time of their life, and thus give them an opportunity of outgrowing the enemy that lies lurking in their lungs, ever ready to take advantage of the slightest indiscretion committed at a time when the weather becomes its ally. Probably the same atmospheric conditions that increase the mortality in this disease are favourable to its invasion. Many physicians, however, find a difficulty in tracing back the history of consumptive cases, to ascertain even the year in which the first symptoms appeared; so that we have but very few data to go upon as to the season. Of course there are a large number of cases that can be dated to a distinct attack of severe cold; and in order to arrive at anything like accurate knowledge on this subject, statistics of the *first attacks* should be made, and compared with the prevailing meteorological phenomena of the seasons in which they took place. The first class of consumptive cases who had been lingering for some time (*ὑποφθειρομένων*) leads us to the subject of the average duration of phthisis; and for the sake of illustrating the facts connected with it, we will subjoin the table which the physicians of the Hospital for Consumption published in their Report for 1849 (*see* following page).

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* Œuvres d'Hippocrate, ed. Littré, tom. ii. p. 608.

We shall here conclude our observations on the *First Constitution*, and pass on to the consideration of the *second*, which the reader will find to comprehend an entirely different set of diseases from those which we have just been discussing (*see* p. 30).

Second Constitution.

General Remarks.—In a review of the meteorological phenomena of this Constitution, and the diseases which prevailed during their predominance, we are at once struck with the great contrast that obtains between this year and the one that we have just had under our observation; for whilst, during the first, *dryness* of the air and a *southerly* aspect of the wind prevailed, the second was characterised by *moisture, frequent rains,* and a *northerly* direction of the wind throughout all its six seasons. Again, the diseases of the First Constitution were distinctly those of the respiratory organs, whilst those of the seasons now to be discussed were connected with the organs of digestion and alimentation; besides which, there were many cases of fever, and it will be interesting to trace in the sequel how many of the diseases that assailed the inhabitants of Thasos during this period were associated, not only with their peculiar exposure to the northerly winds which blew over Thrace, but also with their own habits, which have been alluded to before. As a people, in the midst of great temptations to exceed in the use of alcoholic liquors, owing to the fruitfulness of their vineyards, they were especially liable to fevers, which are now classed under zymotic diseases in the Registrar-General's Reports, and whose prevalence among the inhabitants of those nations has become a matter of common observation.

(*a*) *Ophthalmia.*—From the description given by Hippocrates there is little difficulty in recognising *purulent ophthalmia:* ὀφθαλμίαι ῥοώδεες, ὀδυνώδεες, ὑγραὶ ἀπέπτως, σμικρὰ λημία πολλοῖσι

TABLE

Showing the Duration of Phthisis in 215 fatal cases: viz. 147 Males and 68 Females.

Ages.	Under 3 months.		3 to 6 months.		6 to 9 months.		9 to 12 months.		12 to 18 months.		18 to 24 months.		24 to 30 months.		30 to 36 months.		36 to 42 months.		42 to 48 months.		Above 4 years.		Doubtful.		Total.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
Totals Male and Female......	1	0	17	5	28	8	22	8	21	13	10	12	15	8	1	5	7	2	3	1	11	3	11	3	147	68
Totals Both sexes ...	1		22		36		30		34		22		23		6		9		4		14		14		215	
per cent. Male and Female...	0	0	11·5	7·3	19·0	11·7	14·9	11·7	14·2	19·1	6·8	17·6	10·2	11·7	0·6	7·3	4·7	2·9	2	1·4	7·4	4·3	7·4	4·3		
per cent. Both sexes	0		10·2		16·7		13·9		15·8		10·2		10 5		2·8		4·2		1·8		6·5		6·5			

SECOND CONSTITUTION. (*Κατάστασις δευτέρα.*)—Observations made at Thasos. (*Ἐν Θάσῳ.*)

Season.	Rain.	Wind.	Temperature.	Cloud.	Snow, etc.	Name of Disease.	Remarks, etc.
Autumn. Commencement. *Πρωὶ τοῦ φθινοπώρου.* During the Pleiades and until their setting.	Stormy and rainy *ὕγριοὶ καὶ προεκρηγνύμενοι.*	Strong northerly and southerly. *ἐν βορέιοισι καὶ νοτίοισι πολλοισιν*					
Winter. *Χειμὼν.*	Much rain and great torrents. *ὕδατα πολλὰ, λαύρα, μεγάλα.*	Northerly. *χειμὼν δε βόρειος.*	Not unseasonably cold. *οὐ λίην δε ἀκαίρως τὰ τῶν ψυχέων.*	Occasionally fair. *μιξαίθρια τὰ πλεῖστα.*	Snow. *χιόνες.*		
After *Winter Solstice.* *Μεθ' ἡλίου τροπὰς χειμερινὰς.*	Much rain. *ὕδατα ξυνεχέως πουλλὰ.*	Winterly storms and north, instead of Zεφυρος (west). *ὀπισθοχέιμῶνες μεγάλοι· βόρεια πολλά.*		Tempestuous and cloudy. *ὀυρανὸς λαιλαπώδης καὶ ἐπινέφελος.*	Snow. *χιὼν.*		"The whole season having been generally wet, cold, and subject to a north wind, people were for the most part healthy during the winter, but early in the spring many required medical assistance." N.B. All the later meteoric phenomena continued until the equinox.
Spring. *Ἠρ.*	Rainy. *ὑδατῶδες.*	Northerly. *βόρειον.*	Cold. *ἠρ δὲ ψυχρὸν.*	Cloudy. *ἐπινέφελον.*		(*a*) Ophthalmia (purulent ?)	*ὀφθαλμίαι ῥοώδεες.* This ophthalmia was painful, and the discharge unconcreted. It lasted in some instances until the autumn.
Summer. *Θέρος.*		The Etesian winds blew constantly. *Ἐτησίαι συνέχεες ἔπνευσαν.*	Not unusually sultry. *οὐ λίην καὶ ματῶδεες.*			(*b*) Dysenteric affections. Tenesmus. Lientery. (*c*) Diarrhœa (bilious), with thin, copious, and undigested dejections.	Many of these affections followed the fever that prevailed, on which dropsy sometimes supervened, and then a fatal result was generally the sequel.
Autumn. *Περὶ ἀρκτοῦρου.*	Much rain. *πουλλὰ πάλιν ὕδατα.*	Wind in the north. *Ἐν βορείοισι.*				Watery stools. Strangury. Bilious vomiting.	
						(*d*) Fevers of various sorts. Convulsions. Small rashes.	*Semitertian.* There were many deaths from fevers.
						Swellings about the ears.	Those swellings did not suppurate, but were often determined to the joints.
						Strangury. Abscesses. Sweatings.	These supervening, were considered critical.

δυσκόλως ἐκρηγνυμένα: for the first part of this sentence gives in a few words the most prominent symptoms of this complaint,—such as the profuse discharge and the pain; the remainder seems to refer to small pustules that formed at the angle of the eye, and were hard to bring to maturity. The form of ophthalmia does not seem to have been very severe, or else more stress would have been laid upon it; probably it became an epidemic during this constitution, and, as such, of course would attract more than ordinary attention.

In his Aphorisms, sec. iii. 13, Hippocrates observes, "that if the winter have been *dry* and *northerly*, and the spring *rainy* and *southerly*, of necessity there will be ophthalmia in the summer." The constitution of the present year, although it was decidedly northerly, yet it was characterised by much wet. In the "Airs, Waters, and Places," it will be found that our author describes an ophthalmia as occurring epidemically in places exposed to cold winds, having an aspect between the rising and setting of the summer sun, and sheltered from the warm southerly winds. This affection was of a most severe form, and often ended in the rupture of the eye (*καὶ εὐϑέως ρηγνυσϑαι τὰ ὄμματα*), in which respect it resembled that dreadful disease which afflicted our troops while in Egypt, as well as on their return from that country. Dr. Vetch, in his Treatise on the Diseases of the Eye, gives a history of this Egyptian ophthalmia. The contagiousness of the disease is particularly mentioned by this writer,—a characteristic of purulent ophthalmia well known to Galen, who says "that there is danger of being infected, as well by a certain kind of itch as by ophthalmia" (Galeni Opera, ed. Kühn, vol. vii. p. 279). Dr. Vetch observes that at Malta, where the greater part of the troops landed on their return from Egypt, this disease continued to present itself in the different regiments, and was communicated to several women with whom the men associated. Those soldiers that landed at Gibraltar seemed to benefit by the climate, which proved rather favourable than otherwise to the amelioration of the complaint (Dr. Vetch, op. cit.) About the same period purulent ophthalmia broke out in the militia in Ireland, in 1804, and was communicated to the second battalion of the 52nd regiment, not a man of which had been in Egypt. Sloughing of the cornea, and consequent destruction of the eye, were too frequently the sad sequel to days and nights of excruciating agony. The meteorological conditions favourable to the development of purulent ophthalmia are too little known to admit of a definition. The fact that the same kind of disease was nearly synchronously developed in Egypt and Ireland among our troops, lead to infer that two very opposite climates are capable of producing the self-same disease. We have seen that Hippocrates inclines to the belief that northerly winds have a great deal to do with this disease; and Galen, in his commentary on this passage, vol. xvii. a. p. 93, states that the eyes, being exposed to the northerly winds, which were accompanied by much moisture, were the first organs that began to suffer from this constitution. In Egypt there is an adage that the fine sand which is frequently suspended in the air can get through an egg-shell. This of course must prove a great source of irritation to a conjunctiva already made over-sensitive by the brilliance of the sky, and greatly conduce to the production of ophthalmia, especially in persons, as in the case of our troops, who are strangers to the climate.

(*b*) *Dysenteric Affections.*—These and other affections of the alimentary canal were very prevalent during the summer and autumn of this constitution. The preceding spring had been *cold, wet,* and *northerly.* The summer was cooled by the Etesian winds, so that it was not unusually sultry, and the autumn was *wet* and *northerly.* Hippocrates, in his Aphorisms (iii. 15-16), remarks that dysentery is a disease of *dry* seasons. Again (xii.) he says that "if the winter have been *dry* and northerly, and the spring *rainy* and southerly, of necessity there will be acute fevers, diseases of the eyes, and *dysentery,* in the summer, especially in the persons of women and men who are of a humid nature (sebaceous complexioned). But dysentery was not the only disease mentioned by Hippocrates, for he adds lientery, tenesmus, bilious diarrhœas. Galen, in his Commentary on this passage (vol. xvii. *a*, p. 101), attributes the prevalence of these alvine affections, first of all to the *cold*, which had the effect of condensing the skin and thickening the animal juices; and, secondly, to the *moisture*, which not only did not admit of exhalation of the redundant humours from the surface, but actually increased their amount; consequently an accumulation took place in the system, for which nature found an outlet either through the liver or the bowels. Hippocrates well remarks that *cold* acts more energetically and promptly on weak *moist* subjects, and on women, than on the robust; and thus he explains how it is that such persons are so liable to dysentery during cold weather, for their cutaneous secretion is lessened, the vessels of the surface are constricted, the blood is thrown internally, and this loss of balance in the circulation, instead of being followed by a healthy reaction, as in robust subjects, is the first element of congestion, which often terminates in a flux. It must be remembered that some of the affections enumerated above, such as tenesmus and strangury, were symptoms of the severe form of dysentery, and not distinct complaints. We shall first give an outline of the opinions of ancient and modern authors with regard to the influence of the seasons on this disease, and then proceed to analyse the relation that its prevalence bears to the meteorological condition of the region at the time of its being an epidemic.

The Season in which Dysentery generally occurs.—On referring to the table of the Second Constitution, we find that it prevailed during the *summer* and *autumn* (κατὰ δὲ θέρος καὶ φθινόπωρον).[*] Hippocrates also enumerates it among the diseases of autumn (Aph. sec. iii. xx.) Aretæus[†] remarked that dysentery prevailed most in *summer*, next in *autumn*, rarely in *spring*, and least of all in *winter* (γίγνεται δὲ ϑέρεος ὥρῃ, δεύτερον φθινοπώρου, ἧσσον ἦρος, ἥκιστα χειμῶνος). Dr. Joseph Brown's* experience has led him to observe that dysentery is generally most prevalent during the latter end of *summer* and *autumn*, when the alterations of temperature are sudden, and especially where there is considerable discrepancy between the heat of the day and the night. Mr. J. Ranald Martin, in his interesting papers† on the Disorders and Diseases of Tropical Climates, says that dysenteries become more frequent, severe, and complicated, in the rainy months that succeed to the hot season in the East: further on, he adds that dysenteries, frequently complicated with hepatic disease, are among the acute diseases of the cold season. Galen merely quotes the opinions of Hippocrates, who, besides ranking dysentery among autumnal diseases, remarks that in the *spring*, and especially in the summer, men are seized with dysenteric affections‡ (ὁι ἄνϑρωποι τοῦ ἦρος καὶ τοῦ ϑέρεος μάλιστα ὑπὸ τῶν δυσεντεριῶν ἁλίσκονται). We shall now give the result of the Registrar-General's statistics on this subject, so far as the metropolitan districts are concerned, and compare them with the preceding remarks (see table in following page).

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[*] Hippocrates, ed. Kühn; Littré, vol. ii. p. 616.

[†] Ed. Kühn, p. 161.

The totals place the different seasons in much the same order as we have seen above the experience of Aretæus led him to adopt; the *summer* invariably proving to be most fatal, and the *autumn* next. Statistics, however, seem to show that the *spring* is rather less obnoxious to persons labouring under dysentery than the *winter*; the mean for the different quarters of the eleven years being—

Summer, 61·10; Autumn, 41·8; Winter, 22·9; Spring, 19·6.

Diarrhœas are mentioned as having been prevalent during the summer and autumn of this second constitution, and it

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* Encyc. Practical Med. vol. i. p. 658.

† Lancet, vol. i. and ii. 1850.

‡ Galeni Op., Kühn, vol. vi. p. 690.

Number of Deaths from Dysentery in each of the Four Quarters of the following years.				
Years.	Winter.	Spring.	Summer.	Autumn.
1838—39—40*	55	41	104	54
1841†	17	12	29	20
1842‡	21	11	71	48
1843§	33	17	121	103
1844§	29	18	44	34
1845§	14	17	43	25
1846§	20	18	75	43
1847§	34	39	143	91
1853‖	28	42	51	41
	251	215	681	459

must be remembered that when the number of deaths from diarrhœa rose in the year 1849 to their maximum, viz. 3463, dysentery was also more fatal than it had been for any of the ten previous years; the deaths from this cause being 370, whilst those from cholera were 14,125.

The Meteorological Conditions of the Air conducive to Dysentery.

Humidity.—The amount of wet weather during the whole of this second constitution was remarkable, and undoubtedly operated as a powerful cause in the production of the prevailing diseases. When we reflect on the important part in the animal economy that devolves on the cutaneous system, how necessary the due performance of its duties is in order to preserve the internal organs from being overtaxed, and how much its function is influenced by external agents, we must consider the skin to be one of the grand media through which the atmosphere and its varied conditions act upon the viscera within. Twenty-eight miles of perspiratory tube are estimated to be distributed over an average-sized adult, seven million glands are constantly working to carry off redundant moisture and excrementitious matter; eleven grains, according to Seguin, are insensibly exhaled every minute, or about thirty-three ounces daily, which is nearly equal to the amount of the renal secretion, the latter being regulated by the former,—for in the warm dry air of summer the skin is stimulated to increased activity, and relieves the kidneys: on the other hand, in the winter, exhalation from the surface is impeded by cold and moisture, and consequently the renal organs are called upon to supply the place of the skin. A simple illustration of the effect of a humid atmosphere upon the process of exhalation and evaporation is seen in the difference between the action of the dry and wet bulb thermometers which are used to test the hygrometric state of the atmosphere. In ascertaining the amount of moisture in the air, meteorologists have been for a long time in the habit of using several ingenious contrivances, but that most in use at present is an instrument having two thermometers attached to it; one of these has its bulb covered with thin muslin, to which is attached some floss-silk or cotton lamp-wick,—this is called the conducting thread, and is used to keep up a communication by capillary attraction between the water in a vessel placed below, and the layer of muslin on the bulb: the other, or dry thermometer, indicates the temperature of the atmosphere without reference to its moisture.

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* Registrar-General's Third Annual Report, p. 354.

† Op. cit. Fourth Annual Report, p. 335.

‡ Op. cit. Fifth Annual Report, p. 472.

§ Op. cit. Eighth and Ninth Annual Report, p. 146.

‖ Tables for 1853, for the fourteen years from 1840 to 1853.

In the evaporation of water there is always a certain expenditure of heat, which is in the direct ratio of the amount of evaporation: for instance, supposing that the air be so saturated with moisture as to suspend evaporation from the wet bulb thermometer, no extra heat being expended in the conversion of water into vapour, the two thermometers would indicate the same degree of temperature; but, on the other hand, if a difference exist, we know that the number of degrees which the wet bulb is lower than the dry bulb, indicates the quantity of heat that has been used in evaporation: thus, if the two thermometers stand at 60°, the surrounding atmosphere is in a state of saturation, and therefore incapable of taking up any more moisture; evaporation is suspended, and no extra heat required; the wet bulb in this case, therefore, having no demand made upon it for its caloric, indicates the same temperature as the dry bulb. When, however, the dry bulb stands at 60°, and the wet bulb at 41°, then we infer that the air is far from saturation point; and from the accurate calculations and tables of James Glaisher, Esq., we know that 3·95 grains of vapour are required to saturate a cubic foot of air under such circumstances, and that the actual amount of moisture in this quantity is $=1{\cdot}92$ grs. $1{\cdot}92+3{\cdot}95=5{\cdot}87$ grs., which is exactly the weight of vapour in every cubic foot of air when both the thermometers stand at 60°. This illustration has been given in order to show the distinct relation that obtains between the hygrometric state of the air, the amount of evaporation of water from moist bodies, and the expenditure of heat in this conversion of water into vapour. Now if the atmosphere be loaded with moisture, it not only interferes with the cutaneous exhalation, but it has a similar effect on the pulmonary mucous membrane, which exhales about twenty ounces of vapour in the twenty-four hours. The reader must not forget that the skin is a *respiratory* organ, and adds its quotum to the maintenance of the animal heat, as has been found in the experiments of MM. Becquerel and Breschet, who glazed the skins of shaved rabbits, and found, although the cooling process of the evaporation of the perspiration was stopped, that the temperature of the animals fell from 100° to 76° in about an hour. So important a feature in meteorology as the indication of moisture in the atmosphere, could hardly escape the observation of the antient physicians; and on referring to their works, we find that they were all alive to the influence that it exerted on the healthy as well as on the diseased body. Galen, in his Commentary on the Epidemics of Hippocrates,* seems to draw a line between the effects of moist and dry weather: the former, he says, is apt to affect the bowels, producing belly fluxes (κοιλίης ῥύσιες), and the latter the *renal* organs. It will be well to bear in mind this remark, for it is one of great importance, and quite pertinent to the present subject. In hot moist conditions of the air,—for instance, during the hot and rainy seasons in Bengal,—there is great vascular and nervous excitement, the blood is determined to the surface, and whilst, during the rainy season, the atmosphere is loaded with moisture to saturation, the cutaneous exhalation, instead of evaporating, and cooling the body, pours out without relieving the intolerable heat: this inordinate aqueous discharge increases the density of the blood, renders it a stimulating fluid, and at the same time the body becomes susceptible of the least impression of cold; the air, from its saturation with moisture, becomes less vivifying, being filled with emanations from decomposed animal and vegetable matters; in fact, as Mr. Ranald Martin observes,† it becomes "a tainted vapour bath," to the malarious influence of which the body has become highly susceptible. To the stimulating properties of the blood, deprived by excessive transudation of more than its usual amount of water, and of less of its hydrocarbon, are referred by Dr. C. J. B. Williams the disposition to liver complaints, *dysentery*, and cholera. Now it must be evident to the reader that the meteorological conditions conducive to so severe a form of dysentery as that just referred to, are never observed in England, and that, in fact, the deaths from this disease, when compared with the mortality arising from many others, are really very few, although pretty constant in their average.

Temperature.—I think that we may safely infer, from what Hippocrates has said of this constitution, that there was no great

* Gal. Op. ed. Kühn, vol. 17, A, p. 32.

† Op. cit.

amount of hot weather during the six seasons; we therefore cannot ascribe to the temperature the prevalence of dysentery: in fact, no disease can be said to be dependent for its development on only one or two causes; it is the combination of conditions well blended together that gives an impulse to the disease-germ, and renders the animal system fit for bringing it to maturity. In such a concentration, one element may be more or less prominent at any particular season, when certain diseases prevail, but this is no reason why they should be hastily attributed to this one cause, because it happens to be the most conspicuous; although there can be no doubt that it may have had its share in the preparation of the poison. In the germination of seeds, heat, moisture, and access to air, are necessary; but should any one of these conditions—moisture, for instance—preponderate, would it be reasonable to ascribe to this one cause alone the shooting forth of the plumule and radicle? We must look to the union of conditions, if we desire to fathom the origin of disease, and not allow ourselves to be led away by what superficially appears to be the most active agent connected with it.

Considering the small number of deaths which weekly take place from dysentery in the metropolitan districts, it may be thought that I have dwelt too long on this disease; but I thought that I could not pass it over without mentioning some of the few meteorological conditions that generally precede and accompany its attacks upon our countrymen in the East, where we have seen that excessive heat and moisture play so prominent a part in its production.

In London, the weekly average of deaths from dysentery ranges from 2 to 9; and although the higher number is more frequent as the temperature of the year rises, yet there is not a sufficient swelling of the numbers to justify us in attributing it altogether to the increased heat, but rather to that peculiar condition of the atmosphere resulting from a combination of causes, which seems so obnoxious to the alimentary canal; for, as we have observed before, the number of deaths from dysentery invariably rises towards its maximum whenever cholera and diarrhœa are prevalent.

(*c*) *Diarrhœa : Season.*—This disease, together with the one just named, prevailed epidemically during the *summer* and *autumn* of the second year of this constitution (κατὰ δὲ θέρος καὶ φθινόπωρον). In the Aphorisms, sec. iii. xxii., diarrhœa is enumerated among the *summer* diseases, and we find in the same place that our author also notices the prevalence of sudamina (ἵδρωα) during this season,—whether, however, as a distinct disease, or the precursor of some other, is a matter of doubt: some are inclined to give the *miliary sweat* a distinct place in nosological arrangements. Galen seems to incline to the idea that these sweats accompany certain eruptions on the skin; he does not, however, enlighten us upon the passage regarding diarrhœa, except that it was wont to succeed bilious vomiting.* Hippocrates, however, distinctly says that those affected by the above complaints (ἱδρῶτες πᾶσι πάντοθεν πουλυς πλάδος), sweated much, for there was abundance of *moisture* everywhere.† Excessive sweating, we shall find further on, accompanied the different fevers that prevailed, but without relief. The symptoms that were present in those attacked by the diarrhœa of this constitution resembled much the usual autumnal cholera of this country, such as was described by Sydenham, who wrote fully on this subject. Take, for instance, the epidemic of 1669, and compare it with the description given by Hippocrates. With regard to the *season*, Sydenham says, "Intra Augusti limites se continens, vix in priores Septembris hebdomadas evagatur. *Adsunt vomitus enormes* (ἔμετοι χολώδεες, φλεγματώδεες, καὶ σιτίων ἀπέπτων ἀναγωγαι—vomiting bile and phlegm, as well as bringing up undigested food) *ac pravorum humorum cum maxima difficultate et angustia per alvum dejectio* (διάῤῥοιαι χολώδεες, λεπτοῖσι, πολλοῖσιν, ὠμοῖσι, καὶ δακνώδεσιν ἔστι δ'οἷσι ὑδατώδεες—bilious dejections, or diarrhœa, with abundant thin, crude matters, attended with griping, and in some the stools were watery): sudor (ἱδρῶτες—sweats). It is evident that the form described by Sydenham was of a much severer character than that which attacked the Thasians, for he goes on to detail symptoms which Hippocrates certainly would have noted had they been present at the time. "*Ventris ac intestinorum dolor vehemens, inflatio et distentio; cardialgia; sitis; pulsus celer ac frequens, parvus et inequalis; æstus et anxietas; nausea molestissima; sudor; crurum et brachiorum contractura; animi deliquium; partium extremarum frigiditas, et similia, quæ ægrum in viginti quatuor horarum spatio interimunt.*"* I have thus given at length the description of autumnal cholera by this celebrated physician, thinking that it must prove useful as well as interesting to the student of the present day; since, if he practise in our metropolis, he must be a witness of the fearful havoc that the present form of the disease periodically commits amongst us. Speaking of the season at which cholera generally showed itself, Sydenham said, "*eam* anni partem, quæ æstatem fugientem atque autumnam imminentem complectitur (unice ac eadem prorsus fide, qua veris primordiæ hirudines, aut insequentis tempestatis fervorem cuculus) amare consuevit."† It must be kept in mind that I do not desire, in thus drawing a comparison between the cholera of Sydenham and the diarrhœa of Hippocrates, to lead the reader to suppose that I believe them identical; my object is to show how closely allied the two are in their symptoms; and on referring to the experience of all who have witnessed these dreadful scourges, we hear the same opinion echoed, that they go hand in hand,—often, however, is diarrhœa the advanced guard of the enemy. For a description of cholera by Hippocrates, see further on, under the *Pestilential Constitution*. On looking over the black list of the Registrar-General, we are soon convinced that the latter part of the *summer* and the beginning of *autumn* is still the time of the year most congenial to the development of *diarrhœa.* About cholera we shall have more to say when we are discussing the connection between the grander pestilences that have assailed mankind, and their abundant meteorological phenomena.

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* Gal. Op., Kühn, vol. 17, *b*, p. 619.

† Œuv. d'Hipp. Littré, tom. ii. p. 619.

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* Sydenhami Op. Om. Soc. Syd. p. 577.

† Op. cit. p. 164.

Years.	Winter.	Spring.	Summer.	Autumn.
1845	109	84	449	199
1846	119	153	1549	331
1847	178	202	1196	400
1848	244	239	1048	375
1849	284	240	2457	482
1853	221	292	1232	565
	1155	1200	7931	2352

I have selected the above years on account of the great mortality from diarrhœa during them; the totals place the seasons as follows, in the order of their proneness to favour the development of this disease:—1, summer; 2, autumn; 3, spring; 4, winter. This subject will be again referred to in connection with cholera.

Temperature.—Diseases of the class which we are now discussing seem to rise with the wave of temperature; death in his relentless course seeming determined to have his average number of victims, although, as it were to relieve monotony, he is allowed to change his weapons, at one time with heat and moisture, at another with cold and dryness, now with the east wind, then with the south, does he wage war with those who have death as their curse;—and in all this we see the wise hand of Providence. Were death limited in his resources of destruction in our land as he is in some others, where would be the pre-eminence consequent on the due admixture of temperament? Have not those nations excelled most in the arts, sciences, and war, whose inhabitants have been ever subject to variability of climate, where death makes no distinction of persons, where all classes and all temperaments are at one time or another of the year liable to the invasion of the particular diseases of the well-marked seasons? A nation that has a well-defined climate, with well-defined diseases dependent upon a certain train of meteorological causes, can never rise to so great a height in psychical development as those whose inhabitants have to contend with the vicissitudes of weather. We know that certain temperaments are more liable to take on one class of diseases than another: were the climate of the country to which any set of people had migrated only inimical to a certain set of diseases, then should we find that those who remained would resemble each other, and give a certain character to their posterity, who would possess in the execution of their affairs a peculiar mental bias, which would characterise them as a nation, but never raise them to pre-eminence in the world's fame for a continuance. Whereas in a climate such as that which Greece enjoyed, there was every element for keeping up the balance of mind and body among the inhabitants, variable like our own, during one season the hopeful, the imaginative, the ardent, were assailed; at another, the thoughtful, grave, and phlegmatic; so that a balance was struck to a certain extent at the end of the year, and the next generation did not suffer, but rather improved, under the skilful pruning of death. Happy is it for England that she has the like advantages, ouly to a greater extent: her inhabitants are variable as her climate, and it is this amalgamation of all shades of mental and bodily temperament that has made the Englishman so far superior to the other citizens of the world.—But to return to our subject. We have now to consider the effect of temperature in raising or depressing the mortality in diarrhœa; and we shall find that while bronchitis and pneumonia descend in the scale of mortality as the year rises in temperature, diarrhœa goes and retires with the wave-tide of heat. The Tables III. and IV. will more fully show what I shall now endeavour to explain by a reference to the numbers of the Registrar-General. Although, as we have said before, diarrhœa has been observed to rise in the amount of its fatality as the temperature of the year increases, yet it must be remarked that, in taking the weekly averages for the last ten years, we find this disease pursuing a very steady and depressed course between the eleventh and twentieth weeks inclusive, although during that time the mean temperature ranged in an almost gradual ascent from 40° to 52°; after this, until the thirty-second week, about the middle of August, it gradually increased until the weekly average of deaths arrived at 130 in number, the mean temperature for the same period being 62°,—the highest point to which the mean temperature of the year arrived, if we except the twenty-eighth week, when it was 63°: after this period, both the thermometer and the disease, as a general rule, seemed to decline. With regard, however, to the present year, 1854, in which diarrhœa and cholera have been so fearfully fatal, it will be necessary to make a few remarks before we dismiss this subject. The temperature of the weeks of this year in which diarrhœa raged so much above the average, was far from being higher than usual; in fact, from the seventeenth to the thirty-sixth week the weekly mean of the thermometer, with but five exceptions, was considerably below the mean of the last ten years: immediately before the seventeenth week, and at the commencement of the year, however, the temperature was rather higher than the mean of the corresponding time had been for ten years, and the number of deaths from diarrhœa was proportionally high. When the fatality from diarrhœa was at its height, in the thirty-fourth, thirty-fifth, thirty-sixth, and thirty-seventh weeks, during which 965 died from this disease alone in London, the thermometer stood considerably higher than the mean: thus, 1854, 61°, 65°, 59°, 60°; mean, 60°, 59°, 59°, 57°.

Weekly average number of Deaths from Diarrhœa at different degrees of Temperature.

For the last Ten Years.		For 1854.	
Temperature.	Deaths.	Temperature.	Deaths.
DEGREES.		DEGREES.	
36	15	30	22
38	12	35	24
39	14	37	27
40	14	40	25
43	14	41	20
45	11	42	28
46	13	43–44	33
47	19	46–47	38
49	21	48–49	21
50	31	50–51	50
52–53	22	52–53	44
54	43	55–56	69
56	50	57–58	99
57	54	59–60	223
59	115	61–63	136
60–61	85	64–65	163
62–63	93		

The above tables are only calculated up to the forty-fifth week, and probably, were the figures of the returns for the few remaining weeks of this year appended, some slight difference might be observed; they would not, however, disturb two facts that are self-evident to anyone who glances over the above statistics: 1st, that diarrhœa is materially influenced by heat; and 2ndly, that during this year, 1854, the number of deaths from this disease has been considerably above the average. It will appear from the tables that the effect of the rise in temperature was not immediate, for the number of deaths did not swell considerably above the average of the winter quarter until between the 55° and 58° in this year, and not until the 60° in the average for ten years; neither did the disease decline synchronously with the temperature, for we find it at its acme, viz. 276 per week, when the mean temperature was 6° below the mean average for the year; and the average maximum height, 130, was at the thirty-second week, when the thermometer indicated a gradual decline. These facts seem to point out to us the means by which diarrhœa is affected by heat; its effect is not immediate, as we have seen those of the easterly and south-westerly winds were in pulmonary complaints; heat seems to act upon the living by means of the dead: in the spring and early summer it clothes the world with verdure, prodigious quantities of vegetables are brought into cities for man's use, all are not consumed, what remains dies, is acted upon by *heat*, and putrefies, sending forth its pestilential exhalations. The waters teem with vegetation; it takes some time, however, to raise their temperature, but when it has once reached a certain degree, the putrefactive process goes on; and can man expect to escape, who drinks this poison? Besides decayed vegetables, there is ever a large mass of dead animal matter for heat and moisture to act upon and corrupt; and in proportion as the emanations from these sources are concentrated in the water we drink and the air we breathe, so will the number of victims be. The reader has only to turn to the faithful record of death published by the Registrar-General, to see what tremendous havoc water can produce in a locality when containing the germ of fermentation. Modern authorities—for instance, Crampton and Forbes*—give as one of the causes of diarrhœa an atmosphere simply *cold* and *wet*, as impregnated with putrid exhalations. With some persons, they say, exposure to *warm* and *damp* air is productive of the same consequences; and alternations of temperature are often equally effective, as in the case of a hot day being succeeded by a chilly evening: therefore they recommend as a remedial agent removal to a *mild* and *dry* climate. Chronic diarrhœa, for instance, is one of those diseases in which a change to a *warmer* and *drier* climate than ours is found most beneficial. With regard to the diarrhœa that prevailed at Thasos under this constitution, many of the cases might have been brought on by eating fruit, which, from the con-

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* Enc. Pract. Med. vol. i. pp. 556 and 566.

THIRD CONSTITUTION. (Κατάστασις τρίτη.)—Observations made at Thasos. (Ἐν Θάσῳ.)

Season.	Rain.	Wind.	Temperature.	Cloud.	Snow, etc.	Name of Diseases.	Remarks, etc.
Autumn. Πρὸ ἀρκτούρου ὀλίγον, καὶ ἐπ' ἀρκτούρου. About the equinox. περὶ δὲ ἰσημερίην καὶ μέχρι πληϊαδος.	Much rain. ὕδατα πουλλά. Southerly rains. νότια ὕσματα ὀλίγα.	Northerly. ἐ"ν βορείοισι. Southerly ?					
Winter. Χειμὼν.	Droughts. αὐχμοί.	Winter northʸ. High winds. χ. βόρειος. (πνεῦματα μεγάλα.)	Cold. ψύχεα.		Snow. χιόνες.	(*a*) Paraplegia. (Apoplexy.) Hæmorrhage. Disorders of bowels.	παραπληγίαι. It was fatal in some instances (καὶ τινες αὐτέων ἔθνησκον), especially in elderly persons.
Spring. About the equinox. Περὶ δὲ ἰσημερίην.	Slight rains. Droughts. ὕσματα ὀλίγα. αὐχμοί.	Northerly. Violent storms. ἦρ βορείον. χειμῶνες μέγισται.	Cold. ψύχεα.			(*b*) Ardent fevers.	Accompanied in favourable cases by epistaxis and other kinds of hæmorrhages.
						Difficult parturition. Abortions. Eruption of menses during fevers.	Fever subsequent to parturition (puerperal ?) Considered critical. The rigors of the fever were least at this time of the year, and most in winter.
Summer. (α) Solstice. Περὶ δὲ ἥλιου τροπας θερινὰς.	Slight rain. ὕδατα ὀλίγα.		Great cold until dog-days. μεγάλα ψύχεα.			Dysentery.	Epidemical during the summer.
(β) From Dog-Days to Autumn. Μέτα δὲ κύνα μεχρις ἀρκτούρου.	No rain, great and continued droughts. ὕδωρ οὐκ ἐγένετο, καύματα, κ.τ.λ.	Etesian winds blew. ἐτεσιαι ἔπνευσαν.	Summer. Hot. θερος θερμὸν.			Ardent fevers and phrenitis. Hæmorrhage.	From which there were many deaths. These continued until the approach of winter.
Autumn. Περὶ ἀρκτούρου μέχρις ἰσημερίης.	Southerly rains. ὕσματα νότια.					Swellings about the ears.	About the season of Arcturus many had a crisis on the eleventh day. Children became comatose.

tinued wet and cloudy state of the weather might have been prevented from coming to perfect maturity.

Fevers, &c.—The ardent feverswere not very prevalent this year. The intermittent type was the most important; but these, with the others, will be treated of under the Third Constitution and elsewhere. Some of the fevers seemed to be of an exanthematous character, as there were (Ἐξανθήματα σμικρὰ) small eruptions with swellings about the ears (which, however, did not come to a crisis,—ἡ παρα τὰ ὦτα οἰδήματα μολυνόμενα, και ουδεν ἀποσημαίνοντα).

The eruptions were not in proportion to the severity of the fever, which seems to have attacked children just weaned, up to adolescence; convulsions were often the sequel and attendant during these attacks. Persons of every age suffered, however, although the mortality was greatest among children. The fevers, Hippocrates says, were attended with coughs (βῆχες μὲν παρείποντο τοῖσι πυρετοισιν),* which would give this eruptive disease somewhat the character of measles, although the swellings about the ears and elsewhere, connected with its great mortality, seem to point to scarlet fever. Perhaps an epidemic miliary fever prevailed during the progress of the intermittents and remittents.

Third Constitution.

General Remarks.—We have just been discussing a *wet northerly* constitution, and its attendant diseases, which principally affected the organs of digestion; we have now before us a series of seasons characterised, like the last, by a *northerly* direction of the wind, but by absence of *rain* and great *droughts*. From such a different state of weather we may rationally expect to meet with a different class of diseases; and we are not disappointed, for during this constitution, although we find dysentery and fevers, still the latter were of a most severe character, and their occurrence bore a distinct relation to the surrounding atmospheric causes. Again, diseases of the nervous system were prevalent: thus paraplegia, apoplexy, abortions, and various severe puerperal disorders, all of which will require a separate notice. The year in which these diseases occurred was remarkable for its great dryness: there were droughts in the winter, spring, and latter part of the summer, relieved only occasionally by slight rains; the wind remained northerly, and until the dog-days the weather was remarkably cold. There was snow in the winter.

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* Œuv. d'Hipp., Littré, tom. i. p. 626.

Paralysis, Paraplegia. — The *winter* was *northerly* and *droughty, cold,* with *rough winds* and *snow:* then *paraplegia* (apoplexy, &c.) began to show itself, and attacked many, and some died suddenly; otherwise, the disease became *epidemic* (ἐπίδημον).* Such is the simple but interesting statement made by Hippocrates: let us compare it with what Dr. T. Moffat has observed and recorded.† "Of the number of cases of apoplexy which occurred in the years 1850 and 1851, fifty per cent. took place on days of decreasing readings of the barometer, and fifty per cent. happened on days after such readings; one hundred per cent. occurred with *fall of temperature,* and they all took place with a direction of wind from SE and SW points of the compass; of seven *sudden* deaths, five occurred with wind from NW, with *hail showers.*"

Now with regard to a southerly wind influencing this disease, we must bear in mind that the latter part of the autumn which immediately preceded this northerly winter was characterised by a few southerly rains, the transition from which to an opposite state Galen considered as the chief cause of apoplexy being so prevalent.‡ It must be remembered, however, that the former part of this autumn had been northerly, and this wind was accompanied by frequent *storms* of rain. Dr. Moffat§ has observed that *apoplexy, epilepsy,* and *sudden deaths,* invariably occur with a prevalence of *hail* and *snow* showers. On referring to the Table, we find that cases of sudden death from paralysis took place when *snow storms* and *high winds* prevailed. Hippocrates classes apoplexy among the diseases of *winter* in his Aphorisms, sec. iii. aph. xxiii. In treating on the subject of winds, it will be necessary for me to enter more fully into their relation to disease than I can at present, although I must not pass over an observation of the above physician without a remark, as it bears upon this subject to a certain extent. We have before us the effects of a northerly wind on the system. From the poles to the equator there is a constant flow of cold air, to take the place of that which is heated by the temperature that obtains within the scorching belt of the torrid zone: this heated air mounts up, and then in the higher regions of the atmosphere distributes itself, flowing towards the poles, forming the *upper* or *equatorial current,* which has a direction in our northern hemisphere from SW to NE; whilst the *lower* or *polar current,* which rushes from the colder regions to take its turn under a powerful sun, pursues an opposite course, viz. from NE to SW. Now Dr. Moffat has observed that the *presence of ozone* is oftener discovered in the *equatorial* winds,—that is, in the points between SE and NW, by way of the S and W. It is also stated by this gentleman that a greater number of *diseases* take place during the *ozone* or *equatorial* periods, and that *deaths* are most frequent during the *polar* or *no-ozone* winds, which he accounts for by the fact that, in the case of *diseases,* the atmosphere undergoes greater changes during a *southerly* direction of the wind, which is shown by the frequent oscillations of the barometer: and the tendency to *death* that obtains during the reign of the polar currents he attributes to the reduction of temperature. On referring to the Table of the Third Constitution, we shall find that the observations of Hippocrates remarkably bear out this reasoning. He has shown us that at the latter end of autumn a *southerly* (*equatorial* or *ozone wind*) prevailed, which in all probability laid the seeds of the apoplectic and other diseases to which the subsequent northerly (polar or no-ozone) wind proved destructive.—I must now draw the attention of the reader to the bills of mortality.

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* Œuv. d'Hipp. t. ii. p. 640.

† Assoc. Med. Journ. 1853, p. 129.

‡ Galeni Op. vol. xvii. pp. 161, 162.

§ Ass. Med. Journ. 1853, p. 747.

The Season.—The *winter* certainly contained the greatest number of *deaths* from *apoplexy,* in 1853, than either of the other three seasons, but the preponderance is not sufficient to justify us in believing that this disease is peculiar to this quarter of the year; the spring was only less fatal by 8, the summer by 89, and the autumn by 14. Warmth, therefore, seems to have the effect of lessening the number of deaths from apoplexy, and paralysis seems gradually to decline throughout the year, until autumn, when the mortality from this cause makes a sudden leap, exceeding that during the winter by 41.

Deaths arising from Apoplexy and Paralysis, 1853.

	Winter.	Spring.	Summer	Autumn.
Apoplexy Paralysis	360 326	352 275	281 244	346 367
Temperature of weekly average	38°·1	51°·3	58°·5	42°·3
Mean weekly amount of horizontal movement of atmosphere—Miles	677	642	638	444
Dryness of atmosphere	6·4	8·1	6·9	2·6
		1854.		
Apoplexy Paralysis	380 363	337 312	278 310	335 290

As in the time of Hippocrates, so does it appear now, that apoplexy and paralysis are most fatal *between* the end of *autumn* and the beginning of *winter.* At the time of its greatest mortality, the barometer did not range more than *half an inch* in the week; and in the week when the least number of deaths was registered, the variation was greater, and the mercury higher by nearly an inch, than it was in January. Between the autumn and winter, atmospheric pressure is certainly less than at other times of the year,—and this fall in the barometer is coincident with the maximum of deaths from the above causes.

Temperature.—We have seen that these two diseases decline during the summer, when the temperature of the air is at its maximum; thus showing that it is influenced, to a certain small extent, by heat. *Cold* evidently acts by depressing the vital powers at first; the blood is then driven by it into the internal viscera, and especially into the encephalon, which, from the hard unyielding nature of the cranium, and the exemption of its contents from atmospheric pressure, is peculiarly liable to congestion, when, if the cause be continued, or the power of the vessels overtaxed, apoplexy comes on, with paralysis and death as its companions. During the first three seasons of the year 1854, the 2nd and 13th week of the first, and the last of the spring and summer quarters, contained the greatest number of deaths. Thus—

	2nd Week.		13th Week.		26th Week.		39th Week.	
Deaths	41		41		32		39	
Wind	SE		WSW		SW c.		Calm	
		Variation		Variation		Variation		Variation
Bar. Highest	29·700	00·806	30·264	00·443	29·785	00·312	30·241	00·373
Bar. Lowest...	28·994		29·821		29·473		29·869	
Ther Highest	47° 9	15°·7	71°·0	37°·1	80°·0	35°·5	74°·0	36°·1
Ther Lowest...	32°·2		34°·9		45°·5		37°·9	

This table, however, seems rather to agree with the statement quoted above from Dr. Moffat, although the deaths took place during the *equatorial* winds; the weather was calm, yet generally there was heavy rain in the 26th week, and heavy snow-storms during the 1st week (when there were 32 deaths, and SE), which might have influenced the second. In the 26th and 39th weeks, the great difference between the highest and lowest degree of heat might have had some effect in increasing the number of deaths. We shall contrast this table with another containing the minimum of deaths.

The weekly average number of deaths from apoplexy for this year up to the forty-sixth week, is about 25, and there were twenty weeks in which this number was exceeded:—

1st. Deaths, 32, bar. *dec.* from 29·33 for the first five days, until it reached 28·84; then it *inc.* to 29·01; thence it *dec.* to 28·90; wind SE var.; heavy *snow* fell on four days; temperature sometimes 11° and 12° below the average of thirty-eight years; mean, 5°·6.

2nd. Deaths, 41; bar. *inc.* from 28·81 at the beginning of the week to 29·78 on the eleventh; *dec.* to 29·50 in. on the thirteenth; and *inc.* to 29·64 at the end of this week; wind var. SE; the *temperature above* the average, +2·3.

3rd. Deaths, 39; bar. oscillated three times during this week; it *dec.* from 29·64 in. to 29·56 in. on the fifteenth; *inc.* to 30·05 on the eighteenth; *dec.* to 29·82 on the nineteenth; *inc.* to 30·16 in. on the twenty-first; and *dec.* to 30·06; temperature +5·8; wind S.

13th. Deaths, 41; bar. the mean height was 30·12 in., being a slight decrease from that of the previous week, 30·16 in., when 32 deaths took place: the variation did not exceed 00·44 throughout the week; altogether its height was greater than during the fourth, fifth, and seventh, when the numbers of deaths were respectively 19, 15, and 17 only; the temperature, although +4·0, was −2·0 in the week preceding; the wind WSW.

39th. Deaths, 39; the mean height of the bar. this week exceeded that of the two preceding weeks, as well as that of the thirty-fourth, when only 11 deaths were registered,—the smallest number on the record of this year; the temperature was +1·4; there was a *calm* throughout the week.

The weeks in which the least number of deaths occurred, were the fifth, twenty-eighth, thirty-third, and thirty-fourth.

	5th Week.		28th Week.		33rd Week.		34th Week.	
Deaths	15		18		15		11	
Wind	SW c.		SW o.		SW		SW	
		Variation		Variation		Variation		Variation
Bar. Highest .	30·129	00·322	29·767	00·147	30·022	00·379	30·223	00·560
Bar. Lowest...	29·807		29 620		29·643		29·633	
Ther Highest .	54°·8	29°·1	72°·3	25°·0	79°·8	36°·8	78°·8	34°·1
Ther Lowest...	25°·7		47°·3		43°·0		44°·7	

5th Week. The barometer rose slightly above the height that it attained during the third week, when the number of deaths was fourteen above the average (25), the difference between the means of these weeks being ..117 in., an amount quite insignificant, and not at all sufficient to justify us in supposing that it had much influence in lessening the mortality from apoplexy; it would be more rational to suppose that those who were predisposed to this disease had been killed off during the first three weeks of the year; and thus a depression followed the excess in mortality,—a state of things often observed in other diseases.

28th Week. Certainly the barometer in its mean height had slightly increased since the last week of excess of mortality, but again the amount was small, ..084, and in the next week the deaths *rose* with the barometer; the temperature was —5·5.

33rd Week. The number of deaths *decreased* with the *fall* of the barometer, and after the thirty-fourth week, the mortality irregularly increased until the thirty-ninth week, when the number was 14 *above* the average, and the readings of the barometer *higher* than they were during the weeks when apoplexy was the least fatal. It will be interesting to see the average number of deaths from this disease under every half inch of the barometer, beginning from 29 in. Thus—

Between 29· and 29·500 in 32.
„ 29·500 and 30· in 22.
„ 30· and 30·500 in 27.

From this we find that the maximum number of deaths took place when the barometer was at its lowest mean. It must be remarked, however, that the average between 29·500 and 30 was arrived at through a greater number of instances than either of the other two, and therefore is more to be depended on. The above facts seem to indicate a degree of relation between the readings of the barometer and the amount of mortality, although we must not forget the irregularities that were pointed out when discussing the circumstances attending the decrease in mortality. Two things, however, seem evident,—that the *warm*, genial weather of early summer lessens, and the *cold* and *variable* season between autumn and winter increases, the number of victims of apoplexy. The excess of heat, however, has an opposite tendency to that first alluded to, for a *coup de soleil* is often produced by exposure to the scorching sun of summer. As to the wind, it will be observed that the greatest and least mortality occurred under a southerly wind.

(*b*) *Hæmorrhage.*—Epistaxis, during this constitution, was a frequent accompaniment of the fevers that prevailed; they were considered *critical,*—in fact, the patient was not considered safe until this relief was experienced. There seems, however, to have been a general hæmorrhagic tendency, for blood was poured out in several cases from the bowels: many females had, during the fever, both epistaxis and their menses: abortions were also frequent, and many girls experienced the nisus mensium for the first time.* Dr. Moffat has observed that, in 100 cases of epistaxis, 37·5 occur with *increase* in the readings of the barometer, and 62·5 with *decrease;* with *ozone*, 50·0; with *no ozone*, 50·0: he further remarks that the polar current of air is always accompanied by *increase* in the height of the mercurial column, and that the equatorial, on the contrary, is followed by a *decrease.* When the barometer is low, and the atmospheric pressure diminished, blood is often poured out from the delicate capillary vessels of the lining of the nose, lungs, bowels, and uterus. It is highly probable that the atmospheric pressure was low during the whole of the year under consideration, although of course we have no absolute data to go upon for this hypothesis. The cold weather of the winter in all probability checked the secretion from the skin, and thus congested the internal membranes —a frequent cause of epistaxis: we can easily imagine the effect that suppression of the cutaneous exhalation would have, when it is known that it is sometimes *ten times* greater in *dry* than in *moist* air, and that it is doubled in passing from 32° F. to 64° F.* (Edwards.) I shall now conclude this subject with one or two interesting facts recorded by Dr. Kerr.†

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* Œuv. d'Hipp. tom. ii. Littré, p. 648.

"Morgagni has handed down to us the record of an extraordinary and, so far as we know, a singular instance of the simultaneousness of *epistaxis* in a number of persons. It is stated that in the year 1200 there was a great mortality of men in the space of twenty-four hours, in Tuscany and Romandiola, by a flux of blood from the nostrils: and Morgagni‡ has remarked that Clementini, the historian of Rimini, had noted that in the same year a great number of deaths from hæmorrhage had occurred within four-and-twenty hours at Rimini, Ravenna, and in other cities of the Roman province; but from what part of the body is not mentioned. Various conditions of the atmosphere, it is well known, have a powerful effect on the expansive quality of the blood, as well as of other fluids; besides the effect of the stimulus of heat, the *plethora ad molem* is induced by the same cause; it not unfrequently happens, that passing from a cold into a heated room occasions this kind of hæmorrhage; and *a sudden transition in the natural atmosphere* occasioned, it is probable, the endemic we have just noticed. The same expansive quality of the blood is evinced by alterations of the atmospheric pressure; and in the ascent of high mountains, an early physical consequence has been a flow of blood from the nose, increasing in proportion to the altitude, and succeeded by hæmorrhage from the ears and lungs, as well as by other very alarming symptoms."

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* Ass. Med. Journ. 1853, p. 747.

† Enc. Pract. Med. vol. ii. p. 101.

‡ Morgagni, Epist. xiv. ch. 25.

Hæmorrhage is hardly ever epidemic, and therefore the above facts are the more remarkable. Hippocrates enumerates *blood-fluxes* among the diseases of *spring;* and modern physicians agree with this observation. Some trace an analogy between the "rise of the sap" and the exaltation of the circulation in man. Dr. Copland* says that they occur sporadically, and are more frequent in spring than at any other season, but are scarcely ever epidemic, although at Breslau they prevailed at one time to a remarkable extent,—children having epistaxis, adults hæmoptysis, and the aged hæmorrhoids. M. Chomel remarks that hæmorrhage from the rectum, urinary organs, and uterus, occurs oftener in *cold* than in *warm* seasons; and that epistaxis and hæmoptysis take place more frequently in summer than in winter. Copland† believes this to be the case especially during *dry* states of the air.

Ardent Fevers (Καῦσοι).—Under this head I shall discuss the various effects that this epidemic produced; such, for instance, as *difficult parturition*, and *abortions* (ἐδυστόκεον δὲ πλεῖσται, καὶ μετὰ τοὺς τόκους ἐπενόσεον, καὶ ἔθνησκον αὗται μάλιστα),‡ the *critical eruption of the menses in women and girls attacked*, and the *epistaxis* in men (ἐν τοῖσι πυρεετοῖσι γυναικεῖα ἐπιφαίνετο, καὶ παρθένοισι πολλῇσι τοτε πρῶτον ἐγένετο); its greater *mortality* among the *licentious* and *free livers*, and on those who, after *great fatigue, sat to drinking*, as in Case II., of Silenus (ἐκ κόπων, καὶ ποτῶν καὶ γυμνασίων ἀκαίρων).§ The above will form sufficient texts for our purpose, and I hope to be able to show how distinct a relation is borne between the above facts, and how consistent the observations of Hippocrates are with what passes around us in the present day.

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* Dict. of Med. vol. ii. p. 65.

† Op. cit.

‡ Œuv. d'Hipp., Littré, t. ii. p. 646.

§ Op. cit. t. ii. p. 684.

Although our subject strictly confines us to the study of Meteorology in its relation to disease, yet inasmuch as we have to deal not only with bodies prone to take on disease, but with a poisoned atmosphere; and as we know that unless the latter be very strong, it ofttimes fails to victimise the robust and healthy; in fact, as two conditions are necessary for the full development of an epidemic fever, viz. a predisposition in the body to take on disease, and a poison in the air sufficiently energetic to resist the natural endeavours of the system to throw it off when it has been imbibed,—I think it will be better first to describe the nature of that predisposition, and its different sources, and then proceed to speak of the poison which acts as the exciting cause.

Fevers are called *zymotic* diseases, from the idea that their spread through the system is brought about by a *fermentative* process (ζύμη—a *ferment* or *leaven*, from ζέω—I seethe or boil). In a healthy condition of the body, all the disintegrated tissues, the result of use, are carried off by the different emunctories so soon as they get into the blood: the purification, then, of this fluid is constantly going on, so long as the different excreting organs do their work healthily. On the other hand, should there be any barrier to the elimination of this putrescible matter from the blood, on account of either the liver, the kidneys, the skin, or the mucous lining of the intestines, being unable, from disease or obstruction, to fulfil their respective duties,—an effort will be made by nature to get rid of the difficulty, by making one organ take on the duty of the defective one for the time being: the skin may be relieved by the kidneys, these organs may be relieved by the bowels, and so on: but it must be evident that such a state of things cannot last long: the disorganised result of the waste of the tissues accumulates in the blood, and thus poisons it, rendering it capable of taking on a process supposed to be identical with fermentation, should a leaven from without, in the form either of putrid emanations from diseased bodies, or decayed animal and vegetable matter, come in contact with it, either through the medium of the stomach, lungs, or skin. Deficient action, therefore, of the scavenger organs of the body is one source of the accumulation of deleterious matter in the blood. It will be perceived upon a little consideration, however, that this is not the only condition of the body that brings about a retention of effete matter in the system. All the organs may act well, and yet not be able to depurate the blood sufficiently fast: this would be the case after over physical fatigue, during which there had been a great waste of tissues, which, were time given, would be duly eliminated: at the time, however, that the excess of effete matter remains in the blood, this fluid is highly susceptible of those exciting causes which form our subject.

Again, excessive potations of alcoholic liquors have a tendency to increase the fermentable state of the blood, by impeding, to a great extent, the elimination of the products of disintegration. During fatigue from bodily exercise which may have been carried to excess, there is a general depression of the nervous system, which reacts upon the excreting organs, rendering them less active: sufficient alcoholic stimulus to arouse the body from this depression, and thus augment the depurating powers of the various emunctories, would not be contraindicated; although *excess* under such conditions would be highly injurious, and it could not fail shortly to increase the general depression of the whole system, and thus supply every necessary element for the accumulation of noxious matters.

The uterus after parturition undergoes rapid disintegration, and the products of this process render the blood excessively susceptible of puerperal fever, typhus fever, or erysipelas. I will now compare these facts with the texts from Hippocrates that I have placed at the head of this article.

Fatigue and Subsequent Excess in the Ingestion of Alcoholic Liquors.

Hippocrates could not help considering that these two antecedents had something to do with the attack of epidemic fever that his patients laboured under: he therefore gave them a prominent place in his history of the cases. I have before alluded to his observation that free livers suffered greatly from the prevailing fever; and in his detail of cases (we cannot imagine that he registered every case that came under his notice) he appears to have picked out specimens of what were daily passing under his eye.—Case II. "Silenus lived on the Broadway: after fatigue, drinking, and unseasonable exercise, was seized with the fever, and on the eleventh day died." He began with *having pain in the loins*, urine with a dark sediment, &c. How clearly this description indicates excess of effete matter: the pain in the region of the kidneys, their high-coloured excretion, all betoken excess of disintegrated matter rushing to those emunctories to be thrown off, but not finding a sufficiently speedy outlet went back into the system, and rendered it liable to be attacked by the poison that was floating in every inspired cubic inch of air. In Case VIII. Erasinus was seized after supper; Case IX. Criton was attacked while walking; and Case XII. Hippocrates describes a man as having been attacked after eating supper, and *drinking more than enough*. With regard to *drinking*, in the common acceptation of the term, it can no longer be doubted that it induces a *fermentable* state of the blood; and Dr. Prout has shown that the ingestion of alcoholic liquors diminishes the amount of carbonic acid expired (a product of disintegration), and that this diminution continues until the alcohol is consumed, especially if it be taken on an empty stomach. Dr. Carpenter quotes from the Army Medical Returns the following fact:—"That when the 84th Regiment, which is distinguished for its sobriety, was quartered at Secunderabad in 1847-8, it lost only 39 men out of 1139, or 34·2 per 1000, the average mortality of the other stations in the presidency being about the same as usual. On the other hand, the 63rd Regiment, which was far from deserving a reputation for temperance, had lost 73 men during the first nine months of the preceding year, or at the rate of 78·8 per 1000 during the entire year."* Now we know that the Thasians were altogether, at least so far as regards the men, a loose, drinking set, fond of excess and venery. Such habits undoubtedly tended to increase the mortality during the prevalence of an epidemic. It is, perhaps, within the recollection of many who witnessed the progress of the cholera in 1849, how *brandy* was then looked upon as an amulet against this disease,—how fearful an error it proved to many. Never was Bridgewater in a lower state of moral degradation than at the time its inhabitants were suffering from pestilence. Brandy and its sequels were sought after morning, noon, and night; and to this excess I mainly attribute the great mortality that took place,—a mortality that exceeded that in the worst districts of London during the epidemic of the years 1854 and 1849—viz. 210 deaths to 11,000 inhabitants. One spirit-merchant alone sold upwards of a hogshead of brandy per week in his retail department. Soldiers have been observed to be more liable to take on dysentery, fever, and cholera, *during*, and for *some time after*, the fatigue of a march, than at other times.†

Parturition and Puerperal Fever.—It will be noticed, on perusing the cases of childbed that took place whilst the women were labouring under fever, that many *died* of subsequent fever; but that girls, on the contrary, when attacked, were relieved by the appearance of their menses, and not one died who experienced this critical state of things. In both cases we see an evident excitement of the uterine system, which in the one set of women was followed by relief: not so, however, with the other, who, at a time when the air was impregnated with the *ferment* of disease, had their blood in a most *fermentable* state, in consequence of the disintegration which commenced in the uterus directly it had been relieved of its burthen. Again, we know that where there is a tendency to puerperal fever, the ferment-germ of typhus, or erysipelas, will often increase it, and set up a commotion in the system, which generally ends fatally. Whether the cases recorded by Hippocrates were those of genuine puerperal fever, can only be decided by a comparison between the symptoms that he noticed, and what are now considered to be characteristic of this disease.

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* Dr. Carpenter, Hum. Phys. p. 553.

† Registrar-General's Weekly Return, vol. xv. p. 547.

The time of the Invasion of Puerperal Fever.—Dr. Denman believed that the *third* or *fourth* day after delivery was the most usual time for the disease to appear, although he adds that there is reason to believe that in some cases it has been formed before delivery, and at every intermediate time until five or six weeks afterwards. The first thing that attracts notice is a *shivering* fit, although before the rigor some slight wandering pains are felt in the abdomen, which at last fix themselves in the *hypogastric* region. Case IV. The wife of Philinus was seized with *rigor* and *pain* in the *cardiac* and right hypochondriac region on the *fourteenth* day after delivery. Case V. The wife of Epicrates was seized three days before her confinement, &c. Case XI. The wife of Dromeades had rigor and acute fever the second day after parturition. On reading the descriptions of this dreadful disease in the works of Denman and Hulme, we shall have no hesitation in classing the above cases with those of decided puerperal fever:—the premonitory pain in the hypogastric region and genitals, the rigor and subsequent fever, the cessation of the lochia, the looseness of the bowels, the exquisite pain over the abdomen, the return of the rigor with exacerbations of the symptoms, the thirst, hot dry state of the skin, great anxiety, the *rare* breathing, the thick state of the urine, the pain in the extremities, the obstinate vomiting of whatever is ingested, the delirium, twitchings of the limbs, cold extremities, and convulsions before death; and the critical diarrhœa and reappearance of the lochia in favourable cases.* That puerperal women are liable to be affected by fevers during their prevalence has for a long time been acknowledged, and the most trustworthy writers upon this subject have not neglected to give some account of the epidemic diseases coincident with puerperal fever. The epidemics mentioned by Mr. Hey as occurring in Barnsley in 1808, and at Leeds in Nov. 1809, which continued in the latter town until Christmas 1812, were coincident with erysipelas.

The epidemic that raged in the Dublin Lying-in Hospital in the years 1819-20, was attributed, to a great extent, by Dr. Labatt, to contagion from *typhus* fever, which then prevailed in that city. The epidemic in Birmingham in 1833-4-5-6 was cotemporary with erysipelas in the hospitals and town, according to Dr. Ingleby. Again, in Dublin, in 1828, puerperal fever made its appearance at a time when *typhus fever* was prevalent. From a careful analysis of all the epidemics of this disease, Dr. Fleetwood Churchill† has come to the conclusion that there are often three diseases concurrent with puerperal fever,—bowel complaints (gastro-enteritis), typhus fever, and erysipelas; and I think, from what has been above stated, we may add that it was often observed by Hippocrates to be induced, during the Third Constitution, from the contagion of the epidemic bilious remittent fever. Dr. Ormerod alludes to his belief that this epidemic type is explicable on the supposition of the existence of some *atmospheric* condition affecting all who cannot resist it in the same way.‡ The next question with regard to these fevers is the condition of the atmosphere that induced them. On referring to the Table of this Constitution (p. 47), it will be seen that the seasons through which they prevailed were *cold*, *northerly*, and *droughty*. The scanty meteorological observations of later authors, in connection with puerperal fever, hardly afford us any data to go by; the general conclusions are, however, that this disease occurs at all times of the year. During the epidemic of 1769, 1770, Dr. Leake* observed that about the 14th of March, 1770, a sharp frost commenced, with large falls of snow, and alternate showers of sleet and hail, the wind being at *north-east*. This weather, which was uncommonly severe, lasted till near the end of the month, at which time the malignant force of the childbed fever began to abate. He quoted Hippocrates where this author observes that a *mild rainy* winter, succeeded by *northerly* winds, was dangerous to pregnant women. Agreeably to this observation, Dr. Leake adds, that in the winter, when the childbed fever began, the weather was observed to be remarkably mild and moist, with a warmer temperature of the air than was natural for the season; and this was succeeded by *cold, bleak* winds in the spring (N and NE), which were very unfriendly both to animals and vegetables. M. Tenon,† in his observations on this epidemic, when it occurred after the year 1774, states that it commenced usually about the middle of *November*, and continued till the end of *January*: it is met also at other seasons of the year, even during *spring*.

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* Œuv. d'Hipp. t. ii. p. 691.

† Diseases peculiar to Women, Syd. Soc., p. 36.

‡ Clinical Observations on Continued Fevers, p. 27.

The epidemic of 1746 in Paris prevailed during the *winter*: of twenty women confined in *February* of that year scarcely one recovered.

In England it appeared in the British Lying-in Hospital in London, lasting from June 1760, to the beginning of July 1761.

In the Dublin Lying-in Hospital, from 1st December, 1767, to end of May the next year, of 360 women delivered, 16 died.

In 1774 (Dublin), of 280 women delivered during *March, April*, and *May*, 13 died.

In 1787 *March* and *April*, in 1788 *November*, were the most fatal months.

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* Practical Observations on Childbed Fevers, by John Leake, M.D. 1772.

† Mémoires sur les Hôpitaux de Paris, p. 243, 1816.

The epidemic of 1821-22, in Edinburgh, prevailed from *March*, when the weather was very changeable, accompanied with sudden variations of the temperature. Out of 789 patients delivered, 79 were affected and 22 died. It subsided during the *dry warm months* for from 16th July to 14th October, 1821 there were only *six cases*. After the last of these dates the *cold rainy* weather set in, and with it the disease returned. In the *warm* months of 1822 the disease again declined. (Dr. Campbell). In 1829 it occurred in Dublin to an alarming extent during *January, February*, and *March*. Such are a few facts connected with some of the more important epidemics. Dr. Churchill observes that puerperal fever prevails most during the *winter* or *spring* months, and in *moist* and *cold* weather, or with alternations of cold and warm moist weather. Dr. Butler says that "a sickly season adds both to the danger and frequency of puerperal fever."

Abortions.—That Hippocrates believed in the great influence that weather has over pregnant women no one can for a moment doubt who has read the many passages in which he alludes to this subject. "If the winter be *southerly, showery*, and *mild*, and the spring *northerly, dry*, and *winterly*, those women who expect to be confined during the spring are apt to have premature labours (or abort)."* The premature labours of this season are evidently the effect of the prevailing fevers. Modern authors have observed abortion to be epidemic at times; and Dr. Copland gives the names of those who have mentioned the fact: for instance, Fischer, Tessier, Desormeaux. Agriculturists have observed that cows are apt to slip their calves more frequently at some seasons than at others; and some authorities affirm that it is generally most frequent after the prevalence of wet weather, which is also conducive to the production of ergot in the different grasses on which they feed. In 1852 abortion among cows was very prevalent, although it was a dry season for calving.

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* Hipp. Op. ed. Kühn, vol. i. p. 44.

It is remarkable that the *smell* of a cow that has aborted has a strong tendency to produce a similar effect in another pregnant animal.* During a very wet season at Cannington some few years ago, when there was a great deal of ergoted wheat in consequence, it was observed that for several months hardly any of the women went their full time, and there were numerous miscarriages. There are many opportunities of studying this subject somewhat more fully than several others; inasmuch as if the breeder of cattle were to take regular meteorological observations, many and valuable facts might be obtained which in all probability would be of infinite service to our profession.

The state of the Atmosphere conducive to Fevers, &c.—Were this subject to be fully treated it would take up much more space than is consistent with the object that I have in view,—viz. merely to give a sketch of antient and modern views on the subjects brought under consideration, as an introduction to a more detailed study of meteorological phenomena in their relation to disease. I shall therefore content myself with giving a few extracts from Hippocrates, an epitome of what modern writers have added, and conclude with statistics from the bills of mortality.

Opinions and observations of the antients.—In accordance with what we observe on referring to the Table of this Constitution (page 47), Hippocrates remarks in the Aphorisms, "that fevers are acute in *droughts*; and if these prevail throughout the year, such will be its constitution, and such will be the diseases that we ought to expect."† Again: "If the *winter* have been *dry* and *northerly*, and the *spring rainy* and *southerly*, of necessity there will be *acute fevers*."‡ Whilst travelling, our author mentions that he arrived at Perinthus, a town of Thrace, near about the summer solstice. The winter had been

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* Cyclopædia of Agriculture, Div. vi. p. 547.

† Aph. iii. 7.

‡ Aph. iii. 12.

dry, mild, and *southerly;* the spring very *dry,* until the setting of the Pleiades: if there was any rain, it was only in a few drops. The Etesian winds hardly blew at all. During the summer *ardent fevers* became epidemical (τοῦ ϑέρεος καῦσοι ἐπεδήμησαν πολλοί).*

Aretæus† mentions that persons are liable to ardent fevers during the *spring* (ἔαρος δεύτερον, φλεγμονῇ καὶ πυρετοῖσι καυσώδεσι).

As the fevers under discussion are different both in severity and form to what generally come under our observation in the British Isles, I shall merely give a general view of the conditions conducive to the generation of these epidemics, for our knowledge is not sufficiently accurate to warrant us in making anything like a classification of causes, although such an attainment would be highly desirable; and with the impulse that the study of meteorology has lately received from the medical profession, it may, I think, both be hoped for and expected.

Modern Observations, &c.—As I have remarked before, the weather does not always act immediately upon the system, and produce disease. Heat and moisture may certainly make a decided impression upon the body, and a continuance of this impression may induce a train of phenomena that in the end would be sufficiently marked to justify the term disease; and this state of the atmosphere may affect a great number of people in the same manner, and thus produce an epidemic. The wind, the rain, and the sun, however, act more frequently in an indirect manner. How often do rivers swell with the mountain torrents, flood a neighbouring tract of land during the winter. The stream subsides; not so, however, the adventitious lakes that it has caused: time alone is required for such a mass of water to be drained off or evaporated. During this slow process the land plants die, and form a decomposed mass at the bottom, which, when the heat of the summer sun pours upon it, is resolved into its primary elements, that, under the same influence, combine again to form a deadly poison, which so far has eluded both the chemical test and the microscope. These noxious exhalations then are wafted by the wind over miles of country, polluting as they travel the air we breathe, and thus insinuate themselves into our veins, where too frequently they meet with an ally ready to act in concert with them. In a review of the history of the causes of disease and death, it is remarkable how prominent a part the vegetable creation has ever played, from the first tree, whose fruit was the medium of temptation to Eve, and which perchance would have been immortal, like the first created pair, had they not fallen through its means. In the dead putrescent masses of jungle, there is a connection that must strike any mind who reflects upon this subject. Death was the curse, and nothing that ever had life has been able to withstand this awful fiat. Had man remained immortal, all would probably have shared his immortality, for all was made for him. That death took place both among animals and vegetables long before the creation of man is a fact that the researches of geologists have for some time proved; but at the same time it is not incompatible with the idea of God's endowing the creatures whom he made after "his own image" with endless physical life, when we consider the amazing preparation that our earth must have undergone for the reception of the favoured beings. But to return,—for our theme is the vegetable origin of disease. When man fell he was told that the ground should be cursed for his sake, and that it should bring forth thorns and thistles: moreover, Cain, his first-born, was obliged to be a tiller of the ground. All these passages tend to show that man was to be cursed by the very means that had tempted him to disobedience; and in the sequel of man's history do we not find the herb of the field, which he was doomed to eat, still the source of sorrow, disease, and death? Whether we consider it in the form of the fermented juice of the grape, which throughout all ages has prompted him to commit excess, and made him descend still lower in the scale of wretchedness, augmenting some of his diseases and begetting others, whilst it curtailed his happiness and contracted his days, or in the less inviting one of a filthy heap of *dead* and dying herbs, made pestilential by the very sun that would, under happier circumstances, have lent beauty to their immortality, or visit the trackless jungle, or the deltas and tanks of the rivers of the East, sending forth their invisible poison to the habitations of man, we still are struck with the awfulness of the truth that the fruit of the forbidden tree

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* Ed. Kühn, vol. iii. p. 444.

† Ed. Kühn, p. 37.

"Brought death into the world, and all our woes."

Of course it would be impossible to decide whether death took place first in the animal or vegetable world: all that we know is, that the lower animals were soon after victimised by man both for the sake of clothing and sacrifices, if not for eating. Now it is consistent with the facts in our possession, that animals, especially the herbivora, might have received the first germs of disease from their food, liable, as we know it to be, to be influenced by those atmospheric changes which now-a-days we recognise as the principal causes of disease in plants. Man himself, being partly herbivorous, would be subject to the same disease-germ. However this may be, we find that for centuries he and his companions lived on in simple habits, enjoying great length of years, until at last, corrupted by excess, disease began to germinate within him. The ground had been cursed for his sake, and the rank weed sent forth from its slimy bed, throughout the air he breathed, its thousand elements of death, slaying alike the fowls of the air, the beasts of the field, and man their lord and master. It is well known that the decomposition of certain vegetables is attended with a peculiar disagreeable odour: take, for instance, those plants belonging to the cabbage tribe. Whilst the fallen leaves of a forest are rotting, there is frequently observed a sickly odour, which emanates more powerfully from the fermenting masses under some trees than it does from others: in fact, I have heard it affirmed that persons accustomed to pass much time in or near large plantations of trees can distinguish by their sense of smell, unaided by sight, the class of trees whose leaves have been shed upon the ground. The delta of the Ganges is covered on its south side for many miles in length with the Soondry tree:* hence the name of the locality,—Soonderbuns, which means *the great forest of Soonder trees.* This tract of land extends upwards of one hundred and eighty miles along the coast of the Bay of Bengal, and is notorious for the unhealthiness of its climate. During June and July the rain season commences, inundations take place, the Ganges overflows its delta: the result of this is that an immense mass of vegetable matter is destroyed. The extensive forest of the Soondry tree adds from its vast resources an immense supply of decaying matter, upon which the intense heat of the succeeding September pours, and causes it to exhale from its bed of stagnant waters its invisible but pestiferous poison. The Registrar-General asks these important questions:—" What is the cause of epidemic cholera? Is it the effused flaky matter, from the Indian population on the delta of the Ganges, driven about like the clouds of a leavening dust in the air and on the waters, that has reproduced itself, and has destroyed men, all over the world, either dwelling quietly in their houses, or encamped on hostile battle-fields?"† Decomposed hemp and flax have slain hundreds. Lancisi gives an account of an epidemic fever that raged for several summers in a town of Etruria, almost depopulating it. The cause was sought for, and found in the ponds at the lower part of the town, where hemp and flax were macerating: the practice was prohibited, and the fever no longer infested this otherwise healthy spot. The manufacture of indigo is equally prejudicial, both to those employed in it and those residing near the manufacturies; for in order to extract the colouring matter from this plant it is collected into large heaps, and after it has been drenched with heavy rains it is then exposed to the scorching heat of the sun: active fermentation is set up, and coincident with this state a fearful exhalation of fever-producing gas. Thus, then, we see the three conditions necessary for the production of the fever-germ,—dead vegetable matter, moisture, and heat. Let us see what would be the effect of subtracting one of this trio. Without *vegetable matter,* the other two would be inert, and entirely incapable of producing any specific disease, although they might have such an effect upon the system as to produce an exaltation of the heart's action, and increase the temperature of the blood to such an extent as to induce a febrile state of the body,—which, however, would not be communicable to another person, and would not depend upon zymosis. Without *moisture,* the effect of heat upon plants would be to evaporate their watery particles, and desiccate them like the natural mummies in the rainless districts of the Peruvian mountains. Without *heat,* that putrefactive process which is so essential to the disintegration of the vegetable matter would not take place: a very low temperature is preservative of both animal and vegetable dead matter. At 45° putrefaction commences, and seems to reach its acme at 100°, but beyond this the temperature cannot ascend without checking the process. Dr. Tweedie remarks that marsh fevers are arrested, and entirely disappear in some places, during a hard frost. As spring advances they reäppear in a mild form, prevail more extensively in summer, and in autumn the cases not only increase in number but in severity. He further adds, that precisely the same thing happens with regard to the continued fevers of temperate countries; so that the combination of heat with moisture (acting on vegetable matter) must be admitted to be a powerful circumstance in the production of fever.*

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* Heritiera robusta.

† Weekly Return, vol. xv. p. 502.

That moisture alone is incapable of engendering fever Dr.

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* Cyclop. Pract. Med. vol. ii. p. 191.

Bancroft brings forward the fact, that the men employed in the Newfoundland fisheries, where they are generally enveloped in the dampest fogs for several months together, are remarkably healthy; which, he says, is the least ambiguous proof that the atmosphere, when loaded with moisture only, has no greater power in producing fever than it has when in an usual state of dryness. Dryness is inimical to the generation of miasmata; and this fact seems to controvert the observations with regard to the prevalence of ardent fevers in droughty seasons: but we must recollect that during the first autumn of this Third Constitution there was much rain (*ὕδατα πουλλά*), and we must infer from this statement that in the neighbourhood where Hippocrates made his meteorological observations this wet season left behind it many a stagnant and adventitious lake, whose bed of decomposed vegetable matter formed a nidus, wherein, through the fostering care of the succeeding dry and hot seasons, malaria, in its most virulent form, was reared. To show that moisture without sufficient heat is not powerful enough to produce fever, I may bring forward the fact, that so long as the land is under water, or in a moist condition, these peculiar diseases do not show themselves, and further that moisture even acts as a preventive to the generation of miasm, inasmuch as it has been proved that the artificial flooding of low situations, whose covering has been acted upon by the sun for a long time, and whose influence has engendered pestilential emanations, has been attended by the happy result of getting rid, for a time, of the prevailing fevers in the district. A remarkable fact, and worthy of note in this place, is one recorded in Sullivan's Visit to Ceylon. "A large fresh-water lagoon, of a most green, slimy, tropical appearance, producing in abundance a lotus of almost Victoria Regia magnificence, stretches away to the back of the fort, and around are situated the bungalows of many of the Colombo merchants. The propinquity of this lake would, in any other tropical country (in the West Indies, certainly) be considered as insuring a considerable amount of fever to the neighbourhood; in fact, I doubt whether any advantage would induce a West Indian to locate in such a position. However, in the matter of climate, Ceylon stands *per se,* and offers a total antithesis as regards the healthiness of certain districts of most other tropical countries. Whilst the vicinity of tanks and lagoons of the most fœtid and agueish (looking) is perfectly healthy, that of rivers is equally deadly. The apparent contradiction of the usual laws of nature is accounted for by two reasons. The tanks are covered with various kinds of aquatic plants, which, by a kind Providence, are made to serve not only as filterers and purifiers of the water itself, but even as consumers of a considerable portion of the noxious exhalations that would otherwise poison the neighbourhood. The banks of the river, on the contrary, are rife with fever: the cause assigned is, that during the rainy seasons they swell to a great size, and collect the vegetable matter of a large extent of country; but owing to the rapidity with which they fall at the commencement of the dry season, and the winding and intricate nature of their course, the streams are unable to clear themselves, and this accumulation is left to decay in its bed, and infest the surrounding country. There exists also another reason: the beds of the Ceylon rivers are almost invariably composed of sand, and the stream, instead of sweeping down the decomposed vegetable matter it holds in its waters, as must be the case in hard-bedded rivers, percolates through the sand, leaving the poisonous matter on the surface exposed to the burning rays of the tropical sun." I may add to this, that Ceylon presents an example of the effect of cultivation upon climate; for where the land has been cleared of jungle, drained, and cultivated, the former insalubrity of the air has disappeared; clearly proving what I have above stated, that the two conditions, heat and moisture, are insufficient unless they have decayed vegetable matter to act upon. It must have struck many a medical man how intermittent fevers disappear when the land is thoroughly drained. At Cannington, a village about three miles from Bridgewater, within the last thirty years, ague infested nearly every house in the village, until at last the disease was looked upon as a matter of course. Now, on the contrary, at the Dispensary, where I prescribe annually for nearly one-fifth of the whole population of the parish, I hardly ever get more than three or four cases during the year, and this I attribute entirely to the better drainage of the land in the neighbourhood. Returning again to the climate of the Island of Ceylon—a subject of high interest, inasmuch as the health and happiness of so many of our countrymen are affected by it—I would remark that it affords some peculiarities, which seem to influence the diseases to which the inhabitants are subject. It is necessary for the reader, in the first place, to have some idea of the monsoons which blow over this island; and perhaps he will not think a slight description of them irrelevant to our subject. In this island there are two monsoons in the year, which are respectively called *south-west* and *north-east,* in consequence of these particular winds accompanying them.

The SW monsoon is the first to make its appearance, and may generally be expected along the SW coast, on which the seaport towns Colombo and Galle are situated—(in the latter port, ships from China anchor during the NE monsoon). Between the 10th and 20th of May, the sky becomes blackened by tremendous masses of clouds, emitting lightning, and letting fall torrents of rain, which are accompanied by a squally S and SW wind. This state of things continues about three weeks, when the weather is moderated until the beginning of August: the monsoon is then very pleasant, until early in October, when the sea-breeze fails, and calms prevail until early in November. The NE monsoon begins to sweep over the NE part of the island between the end of October and the middle of November: it is less violent than the SW one, and the rains are very moderate, and seldom extend past December. To the *north* of Kandy, the ancient capital of the Kandian kings, the features of each monsoon are reversed; for in this district, the NE rages first, and with the greatest violence; whilst that of the SW is latest, and least felt. The climate of that part of the island exposed to the NE monsoon is *hot* and *dry*, and on the contrary the western coast, which receives the brunt of the early or SW monsoon, has a temperate and humid climate: the eastern coast resembling that of Coromandel, and the western that of Malabar. The interruption which the mountain ranges of the island presents to the course of the monsoons, causes deluges of rain to fall on one side, while the other is parched with drought.* With this introduction, which has been culled from the best sources, I will compare the above facts with the scanty statistical materials that we possess respecting the prevalence of Fever in this island.†

The following statistics are deduced from the returns of deaths occurring among our troops. It appears that the endemic diseases, such as elephantiasis, are peculiar to the natives, and that dysentery, *fever*, and hepatic attacks, attack Europeans.

Annual Ratio of Mortality per Thousand of mean strength.

	Kandy, C.	Colombo, SW.	Galle, SW.	Trincomalee, NE.
By Fever	25·6	8·5	1·9	19·8
„ Stomach and Bowel Diseases	17·9	21·5	7·8	39·7
„ Disease of Lungs	5·0	5·3	2·6	4·6
„ „ Liver	3·1	4·5	3·9	7·4
„ Cholera	·8	5·8	0·0	14·1
	52·4	45·6	16·2	85·6

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* Imperial Gazetteer, vol. i. p. 644, Blackie, Glasgow, Encyclopædia Britannica, 8th edition, art. Ceylon.

† The disease called *Beri-beri* (Hydrops asthmaticus) is almost peculiar to this island; *beri* is a Singalese word for *weakness*, and by reduplication signifies *great weakness*: it is an acute dropsical disease. (Dr. Maynes' Expository Lexicon.) *Elephantiasis* and other cutaneous diseases are, with affections of the *liver* and *intestines*, common in this island.

It must be remembered that the returns of mortality are confined to the English regiments doing duty in the island, and therefore must not be taken as a criterion of the general effect of the climate upon the more respectable classes, who refrain from committing those excesses to which the soldiery are addicted, and which tell upon them so fearfully, affording another illustration of the opinion that we set out with, and which Hippocrates entertained two thousand two hundred years ago.

These few figures, when attentively considered, afford by their simple aid a great deal of information. We find that fever is most fatal among our troops in the central district of Kandy and the NE of Trincomalee. What, then, are the conditions bringing about this state of things? Kandy is situated in a basin, and on soil exceedingly pervious to wet; the range of the thermometer is from 54 to 87, and this high temperature acting upon a soil moist and containing the débris of vegetable matter, would naturally produce more cases of fever than in a more favoured locality like Galle: at Trincomalee, the temperature ranges from 74°·30 to 91°·30, which excessive heat acts for months on any dead vegetable matter that the floods occasioned by the monsoon had left behind. Here we find stomach and bowel complaints rife. The situation of Galle does not admit of the three conditions necessary for the development to any great intensity of malaria; besides which, the mean daily range of the temperature, as at Galle, is but small. Trincomalee is also more subject to the invasion of cholera. Is it generated in this district, or is it wafted from Sunderbuns during the NE monsoon? —there is no interruption to such a course. The *Sanatarium* of Ceylon is Neevere Ellia, about 6,000 feet above the level of the sea. We find that Hippocrates implicitly believed in the possibility of pestilences being carried from place to place by means of the prevailing winds. The following anecdote is recorded of him: at the same time, however, that I insert it, I must tell the reader candidly that many of the stories relating to the personal history of Hippocrates are not to be implicitly depended on:—When the reputation of this physician had been spread abroad not only by the reports of his judicious treatment of the cases that were brought under his care, but by the praises bestowed upon him throughout the country by those who were fortunate enough to have been his pupils, his advice was sought by neighbouring princes whenever their cities were threatened with pestilence. On one occasion a plague invaded the country of the Pæonians and Illyrians, and the kings despatched ambassadors to Hippocrates, and requested him to come to their assistance; but he was not to be gained, for having learnt from these messengers what was the prevailing wind at the time of the plague in the country whence they came, he prophesied that the pestilence would invade Athens, and in that case he said he should have enough to do to take care of the students, and provide against the calamity by preparing the cities for the attack. With regard to the draining of swampy land for the sake of ridding the neighbourhood of fever, we must not forget to mention that the great Empedocles of Agrigentum, who flourished about 444 B.C., drained a pestilential marsh that was destroying the people of Selinus with fever, and rendering parturition difficult, (Τοῖς δὲ Σελινουντίοις ἐμπεσόντος λοιμοῦ διὰ τὰς ἀπὸ του περικειμένου ποταμο͂υ δυσωδίας, ὥστε καὶ ἀυτοὺς φθείρουσι καὶ τὰς γυναῖκας δυστοκεῖν.* This he effected by carrying two small streams through the swampy grounds, and thus drained off the water: this is recorded on some beautiful coins of Selinus, which are still extant† He also blocked up some narrow valleys with walls, and thus secured a town from the noxious winds that affected its inhabitants and injured the fruit-trees. The effect of wind in driving pestilential emanations from one country or district to another is well known: the inhabitants to the leeward of a swamp may be affected by fever, whilst those on the opposite border escape altogether until the wind shall be in the opposite direction; then the first will be freed from their enemy, and the latter will in their turn suffer. A forest intervening between a pestilential marsh and a city often affords a protection to the inhabitants, and perchance the pestiferous air gets decomposed into innocuous gases during its enlargement among the trees, in a manner similar to the exhalations mentioned above when describing the effect of the lotus upon the stagnant lakes and lagoons of Ceylon. Miasma is also absorbed by water; and the intersection of a district by a river will afford protection to the inhabitants of the country living on the bank opposite to the one in whose neighbourhood the malaria is generated.

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* Diogenes Laertius, London, 1664, p. 230.

† Müller's Literature of Ancient Greece, p. 254. Annali dell' Instituto di Corresp. Archaeologica, 1835, p. 265.

Although the following exanthematous and other fevers can hardly be compared with the bilious remittent form that prevailed among the Thasians during this constitution, yet, in the absence of a true analogue, it may be interesting to discuss briefly the statistics of those fevers which infest our isles, and record what little is known as to the influence that weather and season exert upon them. I have selected small-pox, measles, scarlatina, remittent fever, and typhus fevers, and, as usual, have taken the Bills of Mortality as my guide, and whatever meteorological facts I have been able to obtain relative to the seasons and years over which the nosometrical observations have extended.

Small-pox.—The zymotic character of this disease seems to have struck Rhazes,* for he distinctly warns his patients during its prevalence against making use of "*stagnant waters*, and eating fruits and herbs that are blasted and *mouldy*." To persons of certain temperaments he prohibits grapes, because he observes "that they are liable to make the blood undergo *fermentation*." This author seems to have entertained the idea that the small-pox was prone to enter the system through the skin; for, after making the above remarks, he adds—" If the air be very malignant, *putrid*, and pestilential, their faces may be constantly bathed with Sanders water and camphor, which will have a good effect." As to the state of the air conducive to variola, he gives, as the result of his experience, that the latter end of *autumn* and the beginning of the *spring* are the seasons during which it is most prevalent; but that the *summer* is so also, when there are great and frequent rains, with continued *south winds*, and that it often becomes epidemic when the *winter* is *warm* and *southerly*. In tracing the progress of the small-pox epidemic that commenced in 1667, we find, from the works of Sydenham, that this disease did not make its appearance during the pestilential years that are celebrated in history as being those in which so many thousands were slain by the plague, but that, in 1667, at the approach of the *vernal* equinox, it began to show itself, and from that time until *autumn* (August?) it increased daily, until it had become thoroughly epidemic. From this time its vigour declined, and, as the *winter* approached, its ravages became less. With the beginning of the ensuing *spring* it returned from its retreat, took strength, and spread itself, until it became restrained, as in the year before, by the frosts of the winter: these checked its attacks. After this it came a third time, and showed itself strong in the early part of spring. It soon, however, began to flag, and became crippled, extending itself less than in the two preceding, and finally, in the month of August 1669, died away altogether, making way for an epidemic dysentery.* The experience of Rhazes and Sydenham seem to lead them to the same opinion with regard to the effect of the seasons upon this malady in an epidemic form. Both have observed that the *spring* and *autumn* are the most favourable for its development, although Rhazes very wisely adds, "that in consequence of the great diversities of countries and dwellings, and occult dispositions in the air, all these things admit of great differences, so that they happen in all seasons."†

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* Rhazes on Small-pox, translated by Dr. Greenhill, Syd. Soc., pp. 33, 38, 40.

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* Sydenham's Works, transl. by R. G. Latham, M.D., Syd. Soc., vol. i. p. 721.

† Op. cit.

We now come to a comparison of these opinions with the statistics of the Registrar-General, bearing well in mind, however, the probability of this disease having undergone a great modification since the introduction of vaccination by Jenner. The mean of the last ten years proves that the small-pox is the most *fatal* (this does not always imply most *prevalent*) during the *winter*, the average number of deaths from this cause being as follows:—

Winter	Spring	Autumn	Summer
226	221	217	208

It must be observed, that the range between 226 and 208 is not a very extensive one, and certainly not a sufficient one on which to form even the vaguest aphorism. The reader will recollect, that the epidemic small-pox, whose history Sydenham so elaborately wrote, *succeeded* the *plague*. In 1854, London was again visited by the cholera, and it is remarkable that during the three first seasons of the year the number of deaths caused by small-pox were considerably *below* the average of the last ten years, but that during the last quarter it rose considerably *above* it, the weekly returns beginning to swell considerably after the forty-third week, the last in October, when the deaths from cholera had fallen to 66. In 1849, the cholera seemed to have been preceded by the small-pox, for the year 1848 was remarkable throughout for the high rate of mortality from this cause. The constitution of the last year was certainly peculiar and eminently pestilential. The months during which the small-pox was most virulent were characterised by the presence of a great amount of *ozone* in the atmosphere, and the prevalence of the equatorial winds. Thus, the average daily amount of ozone was, during—

October	November	December
4·8	4·7	11·8

The temperature both of October and November were respectively 2° and 3° below the average. The greatest mortality from small-pox took place in December, and was coincident with excess of ozone, high westerly winds, and a low barometer, which was 0·120 in defect of the mean of seven years.* The epidemic constitution of the air in its relation to small-pox has frequently been the subject of inquiry, but at present we know little more than that, at certain periods, this disfiguring scourge goes its rounds, and that frequently, during its visits, there are present many meteoric phenomena, which are known to be the accompaniment of a pestilential state of the atmosphere. We can easily imagine that a zymotic disease,—capable of impregnating the air to the extent of several feet in the vicinity of the patient suffering from it with poison-germs,—might, under some peculiar combination of the elements of the atmosphere, be capable at times of disseminating its invisible ferment with concentrated power, the air as it were being, for the time, congenial to its life, and giving an impulse to its activity,—just as we see how the feathery seeds of some plants will pass over large tracts of land, and, as they drop one by one into the soils over which they are wafted, they either die and leave no record behind them, or else spring up and luxuriate in some far-off land, rejoicing as it were in having found at last a home congenial as the one from which winds had carried them. The air is too often the soil in which the seeds of disease germinate,—can we not follow up the analogy a little farther, by imagining such a thing as a *rotation* of diseases? We know that, in farming, certain crops exhaust the soil in which they are cultivated, and, if continued year after year without a change, at last degenerate so as to become almost extinct. May not epidemics exhaust the atmosphere of those peculiar elements on which they feed in a similar manner? or may not their mobile bed be changed, so as no longer to afford them the means of existence?

Diseases, like plants, may be classed into annuals, evergreens, and deciduals. The last are those which almost entirely disappear at certain seasons, but which as certainly reappear as the seasons themselves do,—let diarrhœa be a type of this class. Then we have the evergreen phthisis, with its steady mortality throughout the year; and lastly, the annuals are those epidemics which flourish for a season in a certain district, and, when they have racked out the soil in which they grow, decline and disappear, until some other epidemic has prepared the air for their reception. We know that many diseases follow each other in regular order, and, as one declines, another springs up and flourishes as it were on the ashes of its predecessors. We are ignorant, however, so far, of the nature of these invisible disease-manures, which foster the handmaids of death; and, even did we possess the knowledge that we confess we lack, it would be of little use unless we could control it, like the agriculturist does his soils, who, by experience and scientific cultivation, can render his land, at the same time, favourable to his crop and inhospitable to weeds.

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* The Weather of 1854, published in the *Times*, January 17, 1855, by E. J. Lowe, Esq.

During the years that the small-pox raged epidemically in England, no peculiar state of the atmosphere was particularly noticed. Although it often began in winter, and reached its height in summer, yet did the heat, dryness, frost, moisture, and the winds, and the height of the barometer, give no clue to its atmospheric source. Epidemic years have been observed, however, to be most favourable, not only to its greater prevalence, but to its greater fatality. Since, however, this disease seems to be more controllable through that blessing, Vaccination, than most other epidemics with which we are afflicted, it is to be hoped that the extended investigations in the study of meteorology, and its relation to disease, will eventually guide the profession to the discovery of those laws which appear to regulate it in the epidemic form.

The Mortality from Small-pox in London.

	Winter.	Spring.	Summer.	Autumn.
The Mean of 10 Years.........	226	221	208	217
In 1854..........................	123	122	142	289

In 1852 the small-pox was particularly virulent: it began to be so in the last quarter of the preceding year. Thus :—

1851.		1852.		
Autumn.	Winter.	Spring.	Summer.	Autumn.
339	389	472	221	74

On referring to the Tables where small-pox, measles, scarlatina, and typhus, are traced, we are at once struck with the fact that *throughout* the year small-pox pursues a much more equable course than either of the other three zymotic diseases. The years 1844 and 1848 were also remarkable for the mortality from small-pox exceeding that of former and later years: the epidemic of 1844 was both preceded and succeeded by years in which measles were unusually fatal. Small-pox appears to be less influenced by the variations in the weather from week to week than the other three diseases. This will be evident on examining the Tables where its course is traced. Were the subject more narrowly studied, it might be discovered, perhaps, that each disease has its own peculiar mode of fluctuating. Some, for instance, as Cholera, rise suddenly like a gigantic wave once in the year, and fall as rapidly as they rise: the wave of others may be seen to swell towards a certain season, and then decline: carrying with it, however, a number of smaller ones, which seem to be dependent on the weekly variations in temperature, wind, and other weather influences. Viewing the fluctuations of disease then in this light, we may describe the disease-wave as having a valley and a crest: the lätter indicating when it is most fatal, and the latter when it is least so. The pulmonary diseases generally have two waves in the course of the year; the valley pointing to the warm summer months, whilst their crests are directed towards the latter end of autumn and the early weeks of winter. Phthisis, however, like small-pox, pursues the even tenour of its course throughout the year, dipping gently towards the more genial summer to rise again in the autumn, and reach its acmé in the succeeding spring. The waves of scarlatina and typhus begin to rise in the spring, and reach their greatest height about the beginning of autumn. Cholera leaps suddenly like a gigantic mass of water thrown up by a submarine volcano, with no smaller fluctuations, culminates in a few weeks, and falls as rapidly as it rose. Were maps of diseases which extend over a great number of years placed side by side in a continuous line, I have no doubt that a practised eye could recognise any epidemic by the peculiar fluctuations which it is in the habit of making.

Measles.—On reference to the Table which represents the statistics of deaths from measles, it will be found that in the year 1854, when small-pox was least fatal—namely, in the *spring*, rubeola slew 476 persons in London, and that when this disease began to decline in the succeeding *summer*, variola showed a tendency to rise in the scale of mortality, and continued to do so until it arrived at its maximum during the *autumn* quarter, when it exceeded the mean quarterly average by 72 deaths, while measles had subsided at the same period to within four or five of the mean for ten years. If we take the mean just alluded to, the relative mortality of measles during the four seasons will thus appear:—Autumn, 364; Winter, 284; Spring, 277; Summer, 270. Whilst for 1854 the order would be somewhat different. Thus: Spring, 476; Autumn, 369; Winter, 344. Summer, 210. The Small-pox Tables show a deficiency in the number of deaths from this disease during the summer months, July, August, and September, the period of the visitation of the cholera, which by the 30th of September had destroyed 9,707 persons. From these facts it will be evident to the student how the even tenour of regular epidemics is interfered with by the grander scourges which every now and then sweep through the habitations of man.

Some are of opinion that the measles often introduce small-pox: Sydenham relates the fact that the epidemic measles of the beginning of the years 1670 and 1674 introduced the small-pox, which this physician remarked was in the second-named year so similar to that which raged in 1670, "that we might almost say that the old disease had broken out afresh, rather than that a new one had originated."* The epidemic measles of the year 1670 "set in early as usual, *i. e.* at the beginning of *January*. They gained strength every day until they reached their height about the *vernal equinox*: after this they gradually decreased at the same rate, and by the month of July were wholly gone." Whether the same epidemic constitution is favourable both to small-pox and measles is a question yet unsolved; at all events there appears to be a certain association between these two so well as other diseases which points to an analogy in the mineral kingdom, whether apparent or real I will not venture to assert. The student may remember the following groups:—Measles and small-pox—scarlet fever and typhus—diarrhœa and cholera, as examples among diseases; and in the mineral world we find lead and silver—copper and gold—iron and coal, associated together in a manner equally mysterious, although evidently the result of some natural law which our scientific researches have yet been unable satisfactorily to explain. From what has been above written we may safely conclude that *measles* is more prevalent during the colder seasons of the year, and that in this respect they follow much the same course as they did during the epidemics of the 17th century: although the statement of Rhazes,† to the effect that "when the *summer* is excessively hot and dry, and the *autumn* is also hot and dry, and the rains come on very late, then the measles quickly seize those who are disposed to them," seems to point to a difference of atmospheric conditions to those which obtained during the above epidemics, yet we must remember that this author evidently intends to describe to his reader the *kind* of seasons that are apt to produce a constitution of the air favourable to rubeola; which would be matured *after* the late rains of the autumn; a period verging upon the winter, and therefore tallying with the season that the measles delight in among our own isles. 2318 died of measles in 1845 in London.

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* Op. cit. vol. i. p. 218.

† Op. cit. p. 33.

Scarlatina and Typhus.—These two diseases seem to follow a very similar course,—they fall and rise with each other; the season between winter and spring appearing to be least, and the commencement of autumn most favourable to their development. During winter, spring, and the early summer, typhus is more deadly than scarlatina, which however leaves its companion behind for a few weeks, to be again overtaken by it at the end of autumn. Throughout the year 1854 scarlatina has been unusually fatal, ranging considerably above typhus with the exception of one week, from the third week in April until the end of the year, when the deaths from this disease, compared with those resulting from typhus, were as one to two.

Typhus has been said to be a frequent companion of cholera. The year 1849 was preceded by two characterised by an immense increase in the mortality from typhus, and the year 1853 was one in which this dreadful and ever present scourge committed more than usual ravages. The cholera both in 1849 and in 1854 reached its acmé in the thirty-sixth week of the year (ending Sept. 9th); the typhus in 1854 was at its height in the fortieth week (ending Oct. 7th); and scarlatina slew nearly two hundred persons in the forty-seventh week (ending Nov. 25). It will be remembered that measles and small-pox took exactly an opposite course, for whilst scarlatina and typhus seemed to rise whilst cholera raged, these were unusually depressed at the time of the epidemic, but immediately rose on the subsidence of the cholera wave.

Before leaving this subject altogether, I think it might be interesting to my readers to have laid before them a short sketch of the different opinions of those physicians who have studied fevers in warm climates, and have applied their knowledge to the elucidation of those passages from Hippocrates which have formed my text. In 1828, opportunities were afforded the French physicians of comparing the fevers of Greece in this century with those described by Hippocrates more than two thousand years ago. M. Roux, who wrote l'Histoire Médicale de l'Armée Française en Morée pendant la Campagne de 1828,* says that at that time the soldiers were afflicted with the prevailing fevers of the country, and in his account of them, details such symptoms as at once lead us to imply that the character of the diseases has not undergone any material change since the days of the Father of Medicine. "Le règne des fièvres intermittentes, rémittentes, et même sub-intrantes, avec un caractère pernicieux, était très remarquable. On a eu plus: on a observé des *fièvres continues* avec des exacerbations très prononcées, dont le danger a été imminent. Au type rémittent, et surtout sub-intrant, se trouvait presque toujours jointe une congestion plus ou moins vive, et d'ordinaire intense, de la membrane muqueuse gastro-intestinale." On which M. Littré† observes: "Ainsi, la Grèce est réellement sous un climat qui est en fait le siége de fièvres rémittentes, et de fièvres continues ayant même nature que les rémittentes: or ces fièvres sont comparables dans tous les pays chauds. Ici on voit deux arguments partir de deux points différents aboutissant à un méme terme. Les fièvres rémittentes et pseudo-continues sont à la fois celles que les observations modernes constatent aujourd'hui dans la Grèce, et celles que la discussion précédente a identifiées avec les fièvres décrites par Hippocrate. La Grèce antique et la Grèce moderne sont, à vingt-deux siècles de distance, affligées par les mêmes fièvres; et cela prouve *que les conditions climatologiques n'y ont pas essentiellement changé;* car l'homme, qui en est un des réactifs les plus sensibles, y donne aujourd'hui comme alors la même réaction."

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* Paris, 1829.

† Œuv. d'Hippoc. tom. ii. p. 563.

Dr. James Johnson remarks,* that Hippocrates seems to have overlooked the effect of the fever-producing effluvia of marshes, swamps, and stagnant waters, which, he adds, is the more remarkable, inasmuch as many of the fevers described by him, and the bilious remittent fevers of our own times, are produced doubtless by the same causes. It will not do to enter into the particulars of difference that obtain between the forms described in the epidemics of Hippocrates and those which we call continued fever of our own climates. I may observe, however, that after this subject having been duly discussed, M. Littré comes to the conclusion that—

1. The remittent and pseudo continued fevers of warm countries differ from those of temperate climates: 2. That the fevers described by Hippocrates resemble the one, and, therefore, differ from the other. Remittent fevers undoubtedly differ from each other, and this difference is often made apparently greater by description. Twining instances that the Walcheren fever did not resemble that which raged in the Mediterranean fleet, described by Sir William Burnett; again, that the autumnal remittent of South Carolina, and of the countries in the United States where rice is cultivated, and which are more or less subject to annual inundations, or abundant periodical rains, differ in some respects from those of Bengal; but that, nevertheless, there is a general resemblance between these in their character, cause, and termination.

The effect of the state of the weather in modifying Fever.—We commonly observe that a fever which breaks out when the air is *hot* and *dry*, assumes the *continued form*; when the air is *moist* and *suffocating*, and especially when filled with exhalations from the soil, that it takes the character of a *putrid remittent*; and that where the temperature is moderate and the air purified, the form does not differ from the regular intermittent (Clark).

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* The Influence of Tropical Climates, London, 1821, p. 23.

Whatever the character of these fevers might have been, certain it is that many conditions of climate and morality cooperated either in producing, continuing, or spreading them. Many were the marshes and swamps in Greece, and hot indeed was the sun then as now; the towns badly drained, the inhabitants fond of excess, and perhaps not over clean in their habits. In fact, every element of fever has from time immemorial existed in Greece. The effects of climate could be often robbed of much of their severity were man resolutely to strive against, instead of encouraging by his neglect in the cleansing of his habitation and person, the very enemy of which he so bitterly complains. Imperfect drainage, bad water, close huddling of families in small tenements, and depraved habits, are powerful allies at home, and too frequently co-operate, as with a foe from without, with the malarious emanations from the neighbouring lagoon or marsh. That man has it within his power to *modify* climate, must be acknowledged by all who have read the history of colonization. We know that the human body, whether in health or disease, is capable of generating a fever producing poison: how careful, therefore, ought we to be to avoid those conditions necessary to such an undesirable end, and especially when we know that the surrounding air is in a state ready to receive the germ and bring it forth to perfection. We shall see in the sequel what were the characteristics of the climate of Greece, and how that it was not the only cause of the different diseases with which its inhabitants were afflicted.

THE PESTILENTIAL CONSTITUTION.

We now come to a subject, which, perhaps, at this present time will greatly interest us, namely, "The Pestilential Constitution" (κατάστασις λοιμώδης of Galen). We shall find on comparing the atmospheric phenomena grouped under the above title with those prevalent at different times, when this and other countries have been visited by plagues and other destructive epidemics, many interesting points of resemblance which, until placed side by side, would fail to strike the observer as features significant of a strong family likeness between one epidemic constitution and another. These features, modified, as those of the human race are, by climate, yet preserve their grand characteristic outline, so that it is not difficult to recognise them when we consider all the sources of their modification. As an introduction to this last part of my work, I shall briefly give a sketch of the more salient characters of the

CLIMATE OF GREECE.

The physical features of Greece present every diversity of character, and this difference of conformation between the several provinces was a powerful cause of the varietyboth in the inhabitants and the climate. I speak of Greece comprehended within its *antient* boundaries, and do not, therefore, confine myself to the limits of the present insignificant kingdom.

As a whole, the climate of Greece is mild; and if we consider the difference between the several constitutions pourtrayed in the "epidemics," and the many allusions made by Hippocrates in these and his other works, we must also call it variable, which undoubtedly it is. It is mountainous, and of course many of its cities and villages have a variety of aspects; and hence it is that we find Hippocrates particularly explicit upon this point: for instance, he says, "Those (cities) that lie looking towards the rising of the sun are naturally more healthy than those exposed to the north, even should there be but the distance of a stadium (606 feet 9 inches English) between them. In the first place, the heat and the cold are more moderate; the inhabitants are more blooming in complexion, and not so subject to disease; their voice is clear, they are of a more lively turn of mind and disposition than those in the north." "A city so situated enjoys, on account of the moderate heat and cold, a climate resembling *spring*; the diseases are less numerous, and not so violent, and resemble those that prevail in cities exposed to warm winds; the women are extremely fruitful, and bring forth children with little difficulty." Again, in the same treatise, a little further on, he speaks of those towns that are exposed to the *west*, and which are sheltered from the east, but are affected by the warm winds, as well as the cold ones from the north, as very unhealthy; a place so situated has a climate resembling *autumn*, because the difference in the same day is very great between morning and evening. He observes that the inhabitants are apt to lose their colour, and that they have deep and hoarse voices.* The contrast here drawn by Hippocrates is remarkable, but we see around us every day the effect of *aspect* upon the growth of vegetables. Many trees and plants there are that perish against a wall looking towards the north; light is the great stimulant both to man and the grass to which he is likened, and whether their supply be curtailed by a wall or a lofty range of mountains, the effect is sure to be observed. Is not cretinism the effect of privation of light? Do we not see it endemic in those very localities which by their situation are shut out from the full light of the day, as Tolinelli remarks, "the shady sides of the valleys;" where, if the sun visit the unfortunate villagers, it is only to give them a sip of its streams of light, which is insufficient to counteract the baleful effects of its absence during the remainder of the day. Bronchocele prevails in the deep, *dark*, and humid valleys of mountainous regions, which are filled with malarious exhalations, and where the atmosphere is seldom ruffled by a breeze of sufficient power to remove the accumulated poison. In Switzerland it is most common in Vallais (Rowland). Were this valley beneath a tropical sun, it would be the seat of pestilence and death. As it is, it must necessarily be bad, for the high ridges of mountains which rise like walls on the north and south sides prevent a free circulation; while in the summer a powerful sun beats down into the valley, rendering it a focus of heat, and extricating from vegetation and humidity a prodigious amount of malaria (Dr. J. Johnson). In our own isles, agriculturists have observed how the direction of the slope of certain districts affect their temperature, and therefore influence the cultivation of wheat. The general inclination of a country greatly influences its climate; but as many countries depend for insular or peninsular position upon ridges of mountains, so must we expect to find that their general inclination is rarely, if ever, the same towards the heavens. As a general rule, the inclination of a region may often be determined by the course of its rivers, which, taking their rise in the cloudy regions of the country's backbone, fall on either side until they find again the ocean whence they derived their vapoury birth. The general direction of the mountain ranges of a country is an important item in the knowledge of its climate, not only in reference to the diseases of its inhabitants, but its capability of bringing to maturity certain crops, which, like wheat, require a certain amount of temperature for their perfection; the British farmer is now fully aware of the necessity of acquainting himself with the aspects of his fields, and their influence on his cattle and his crops. In the extensive sheep walks on the Wilts and Sussex downs, shepherds are careful on the approach of an easterly wind, when their flocks are in a situation having an *easterly aspect*, to remove them at once, in order, as they say, to prevent "the shutting of the blood," which is an inflammatory disease alleged to be the effect of exposure to the east wind in an *easterly aspect.* The mountains of Switzerland afford another example of the effect of aspect, for whilst the vine luxuriates on the southern sides of the Alps, their northern sides are covered with perpetual snow. Again, the snow line descends lower on the northern than on the southern side of lofty mountains. We have seen that Hippocrates was inclined to prefer the morning to the evening sun. In an able article by Mr. B. Simpson, in the Journal of the Royal Agricultural Society,* I find that he considers that an aspect turned partially to the *west* is the best for agricultural purposes. The lands around Cork, the coast of South Wales, the Isle of Wight and contiguous lands, the south Hams of Devon, and the far-famed neighbourhood of Penzance, are districts more or less sheltered from the chilly influence of northerly winds, and open to the full effects of the sun's rays and to the warmth communicated by the higher temperature of the water of the adjoining sea† (Whitley). If we suppose a plain, which receives all the rays of the sun as it passes from east to west, to be raised into a ridge of mountains, one of whose sides looks directly towards the sun, it will be evident that the side on which these beams impinge receives the whole of the heat which otherwise fell upon the plain, whilst the opposite side would be precluded altogether from the benefit of solar light and heat. The aspect of the mountain which looks towards the sun, would, in such a case, receive double the quantity of light and heat that the half of the plain did, and this would soon become evident by the difference in the vegetation when compared to the slope looking towards the north. Besides shutting out or concentrating light and heat, the vicinity of mountains have other effects upon the cities built in the neighbourhood, which are not less remarkable or important to be known. Athens, for instance, not being overhung by mountains, was not subject to be deluged by violent rains or mountain torrents, or masses of air descending along their sides, chilled by their snowy tops, and untempered by the breeze which is shut out from the valley that it would otherwise protect from the cold atmospheric torrent and the collection of malarious gases.

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* Πεϱὶ ἀέϱων, κ.τ.λ.

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* No. xxvi. p. 622.

† On the Climate of the British Islands, in its Effect on Cultivation: Journal of Royal Agricultural Society, No. xxv. p. 138.

The Pindaric range of mountains runs through Northern Greece from north to south, and intersects the Cambunian mountains, whose highest point is Mount Olympus, 9700 feet high, scarcely ever free from snow. The mountains of Arcadia have no connection with the chain of the rest of Greece. They run from east to west generally, but this portion of the Peloponnesus seems to be surrounded by a natural wall. These enormous ridges of limestone, which spread in every direction through this favoured country, afford every kind of aspect, and, whilst they modify the climate, so mould the character of their inhabitants as to make it as diversified as the scenery. Thus Thessaly, with its broad and fruitful plains, its cities sheltered by the enclosing hills, accessible only on the northern side through the celebrated vale of Tempe, stands in strong contrast to the neighbouring province of Epirus to the west of Pindus, where the bleak limestone rocks afford foundations to the villages and towns of the sturdy mountaineers, whose rugged country seems to have imparted its stern character to those whom it nursed, and imbued with a love of exploit and poetry which so frequently characterises the shepherd and hunter, recalling the words of Scott:—

"O Caledonia! stern and wild,
Meet nurse for a poetic child!
Land of brown heath and shaggy wood,
Land of the *mountain* and the flood."*

In tracing the effect of the physical condition of a country on man, we must not limit ourselves to one cause and then seek for an immediate effect. The natural products of a district often have a considerable influence over those inhabiting it in a very indirect manner, and the antient political division of Greece called Bœotia will afford an example. The basin of Bœotia is surrounded by mountains, on the south by Cithron and Parnes, on the west by Helicon, on the north by Parnassus and Opuntian mountains: these are of the limestone formation, the compact nature of which causes the soil to retain moisture, and at the feet of mountains whence small rivers proceed is apt to favour the formation of bogs, and thus not only render a great part of the land unfit for cultivation, but materially affect the superincumbent atmosphere, reducing the temperature of the summer, and filling the air with cold and humid fogs. Such is the case in the neighbourhood of Lake Copais, and in many parts of Ireland, where the same geological conditions obtain. The limestone of Bœotia has, however, been subject to the violent wrenchings of earthquakes, which have fissured it to such an extent as to greatly reduce the evil by the natural drainage it affords of the waters which periodically collect after the swelling of the Ciphissus and its tributaries. These fissures have gradually been worn into channels and subterraneous passages, which lead to the sea between the mainland and Eubœa. These channels, Katavothra, or subterranean gorges, sometimes got choked by alluvial deposits, and in order to obviate this evil, shafts were sunk and artificial emissarii or tunnels were made. The effect of these obstructions was, that the country in the neighbourhood of the course of the Ciphissus got habitually swamped, the air became loaded with moisture and exceedingly inclement, the lake afforded a soil congenial to the growth of the auletic or flute reed (*δονάζ*),* which covered the marshes, and thus lent its simple but effective aid to the cultivation of pastoral music in the valleys at the foot of Mount Helicon, which characterised the people and helped to redeem them from the stigma that their more lively neighbours the Athenians cast upon them; for by these and the other inhabitants of Greece the Bœotian was considered a slow unintellectual being, cultivating his body more than his mind, indulging in the produce of the rich alluvial soil washed by the mountain stream from the neighbouring boundaries of the fertile basin, on which he fed his flocks and reared his fruits, which arrived at the greatest perfection in that thick and misty atmosphere which seemed so hostile to the psychical development of the cultivator. Horace, who was partly educated at Athens, seems to have participated in the general idea that the Bœotians were dull and stupid, on account of their living in the thick air of their native country.

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* Lay of the Last Minstrel, canto vi. st. 2.

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* From δονέω, a reed shaken with the wind.

> "Boeotum in *crasso* Jurares aëre natum."*

The names, however, of Hesiod, Pindar, Corinna, and Plutarch, are sufficient of themselves to raise the character of these people, for their country gave them birth and reared them. The Theban, however, was as a competitor in deeds of physical force generally the victor over the Athenian, whilst the Athenian claimed the ascendancy in all matters pertaining to the elegancies of literature and the arts. Hercules was the exponent of Bœotia, possessing all the attributes of physical life in perfection: powerful, sensual, and impatient of restraint, he afforded a strong contrast to Theseus, in whom were embodied all the higher mental attainments of the Athenian, who studied commerce, the arts, sciences, and literature, delighted in good government, and encouraged every thing that elevated man in the scale of creation. How strange a contrast between two contiguous districts! Do we not see here the powerful effect of climate,—the difference between the irregular and inclement climate that endows the Theban with so much brute force, and that bracing, dry, clear atmosphere which floats over the congenial soil of Athia, giving the Athenian elasticity, good spirits, quick perception, refined ideas, and a love of order, and commerce? Let us now pass on from the fertile valleys of Thessaly and Bœotia to Arcadia, where the physical characters of the country preclude the possibility of agriculture, and force the inhabitants to lead a pastoral life, which necessarily exposed them to the inclemency of the climate, and this, combined with their constant struggle against the unevenness of their country, gave the Arcadian a character at once stern and persevering, although softened by the pipe and lyre, which served to wile away the tedious hours of the shepherd and delight the sense of his flock, which thrived the better when cheered by music. In many points the Arcadian resembled the Swiss: both were fond of music, both were mercenaries in case of war; and this may be accounted for by their vagabond and restless life in the search of new pasturage for their flocks, which destroyed the first element in patriotism, fondness for home, the distinguishing character of the agriculturist.

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* Horace, Ep. ii. 1, 244.

> "Dicunt in tenero gramine pinguium
> Custodes ovium carmina fistula,
> Delectantque deum, cui pecus et nigræ
> Colles Arcadiæ placent."*

Leake observed that the maritime climate of the Peloponnesus was much warmer than the Arcadian hills: in fact, he says that the average climate of Arcadia is cooler by several degrees than that of the consul's native town, though the latter is situated so much farther north. In summer, the same author considered that the sea-coast of the Morea was more healthy than many of the close valleys of Arcadia. To the west of Arcadia lay *Elis*, whose sea-coast during the summer months is rendered unhealthy by the presence of stagnant lagoons, both natural and artificial; the former are produced by the sea breaking over the shore and becoming entrapped by ridges of sand: from these and the neighbouring marshes myriads of gnats and other insects proceed, and render the sea-coast quite uninhabitable during several months of the year,—in fact, so bad were they at one time, that the inhabitants beseeched Jupiter to rid them of the plague.† Kunupeli is so called from the gnats (κώνωψ) which abound there.

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* Hor. Car. lib. iv. 12, 9.

† Paus. v. 14, § 1.

Leake* says that the other lagoons are formed by the excavations made in order to procure clay for building purposes. The exhalations from these pools render Gastani very unhealthy: the houses fortunately are not very close together. The sandy nature of the coast seems to exhaust the small streams which soak into it in their course to the sea, frequently leaving a layer of dead vegetable matter for the sun to act upon, and thus increase the evil. The country was once celebrated for flax, which now, even, is cultivated with considerable success: the subsequent fermentation of this product, as we have seen before, is not at all conducive to the health of the neighbourhood; it appears, however, that this at present is done in running streams, and not in stagnant pools, which may account for its inferior quality. The sheep, which are fed in great numbers, are subject to a plague called evloghiá (εὐλογιά), for which they inoculate the sound animals by taking a small quantity of matter (μάρτζο) from an ulcer of a diseased sheep, and rubbing the ear of a still healthy one with it: it is calculated that the eologhiá may carry off half the ἀνέκτρωτα, or uninoculated, and perhaps sixty per cent. of the inoculated may live. Unwholesome food is said to produce another disorder, called kholianitza (from χολια, gall). The Vidhéla (βιδέλα) is ascribed to feeding in *marshy* places in *August* and *September*, when it is imagined that an insect (ζωόφι) finds its way from the plant to the sheep's liver (Leake). In Elis is the plain of Olympia, the palæstra of Greece. The south coast of the Corinthian Gulf is formed by Achaia, which has a most northern aspect, lying as it does on the slopes of the northern boundaries of Arcadia. The Achæans afforded a strong contrast to their neighbours the Arcadians, for they were bold, adventurous, and patriotic: the free bracing air of the sea, and their rugged coast, imparted to them a character which was well adapted to their maritime position.

The mountains of Greece were often converted by the quick and intelligent into natural observatories, and frequently afforded those who were imbued with a taste for observing the many meteoric phenomena which characterise the climate of mountainous countries, not only to combine them for the sake of solving some of the great mysteries of weather, but with the view of being able to prognosticate the future state of the seasons, and thus prepare themselves and their flocks for the coming change. Many whose memories were stored with well-remembered facts and their sequels, were able to take advantage of their experience; and, without letting the vulgar know the data upon which they based their opinions, prophesied the changes that would take place in the atmosphere; and such a prognosis, if justified by subsequent events, had on many occasions a remarkable effect upon the minds of those who wondered whence this spirit of prophecy could have proceeded. We have only to remember the effect upon the public mind in England that the fulfilment of Murphy's prophecy had; and even in the case of Moore's Almanack, whose popularity has always been great, on account of the predictions therein contained, it is not difficult to trace the same cause operating in the nineteenth century, that made the Æginetans reverence their king Æacus. The editors of Moore's Almanack, with all their parade of astrology, evidently rely upon the statistics of weather, which they cull from many parts of England. and thus may often hazard a prediction which is almost sure to be fulfilled in some part of the British Isles. For instance, it is a fact worth observing, that in or about the seventh week of the year, the temperature suddenly becomes lower: this may be seen upon referring to the Tables I. and II. In No. I. the mean weekly temperature of the last ten years is traced; and in No. II. the mean highest and mean lowest temperature of each week in the year 1854 are given: the knowledge of such a fact is sufficient to tempt many a weather-wise person to prognosticate a greater degree of cold during that especial week, and those who were not aware of the fact would look upon such a prophet as a very remarkable person, and one whose almanacks ought to be bought;

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* Leake, Morea, v. i. p. 2.

observing, as they in all probability would, that his predictions were verified. In all ages the natural has been too often blended with the supernatural; in fact, to the latter have been referred by designing politicians and priests many phenomena that could be solved by the former.—To return, however, to Greece and king Æacus. In this island of Ægina there is a remarkable conical mountain (ant. Oros—ὄρος, the mountain—now called Mount St. Elias) whose summit at the approach of rain was generally observed to be enveloped in a mist, thus affording to those who were aware of the phenomenon an opportunity of taking advantage of the approaching change. During the reign of the just and pious king Æacus,* a serious drought afflicted Greece: the Delphic oracle was consulted, and it proclaimed that it would not be stayed unless Æacus would pray to the gods and urge them to deliver his people and neighbours from the calamity. Æacus undoubtedly knew of the phenomenon just described, and wisely chose the time when the mist was just beginning to dim the outline of the mountain's top, and, before any decided alteration had taken place in the weather, to pray to Jupiter to send him rain: his prayers were answered, the drought was succeeded by plenty, and in order to show his gratitude to the divine author of the happy change he erected a splendid temple to Panhellenian Jove, whose remains still tell the tale of their antient grandeur. On mount Oros there is now a small chapel, dedicated to the prophet Elias, whose history contains an incident that the Christian founder associated with that recorded of the pagan king; and thus, as Wordsworth well remarks, "the stream of paganism was taught to glide in a Christian channel." From the plains of Athens could be seen Mount Parnes (*Mount Ozea,* 4636 feet high), Mount Brilettus or Pentelicum (*Mount Mendeli,* 3642 feet high), and Mount Agmettus (ἄνυδρος καλούμενος,† Macrovuni). This range, varying as it did in height, afforded Theophrastus the means of prognosticating storms, according as these mountains were enveloped in clouds: thus, in his treatise referred to in the note, he observed "that if it lighten over Mount Parnes about the setting of the Pleiades, while Brilessus and Hymettus are entirely covered with cloud, a great tempest may be expected; when the two latter only, a lesser one; but that if Parnes alone [be covered], it will be fine."* In the first instance, we can suppose that the amount of condensation sufficient to envelope so extensive a range of mountains would be attended by the development of a large amount of electricity, which would be evident from the lightning during the storm; but in the case of Mount Parnes being alone tipped by clouds, it proved the lower stratum of air which floated over the plains was warm enough to retain its moisture until by the gentle breeze it was forced into the colder regions of the lofty mountain; and the fact that condensation did not take place until a considerable altitude had been attained, indicated that the air was far from being overloaded with moisture—a condition that is acknowledged to be conducive to fine weather. Homer, a true observer of nature, compares the clouds of dust raised by the conflicting armies of the Greeks and Trojans to the mist with which a south wind frequently covers the hills:

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* Diod. iv. 60, 61; Apollod. iii. 12, § 6; Paus. ii. 30, § 4; Smith's Dict. of Greek and Roman Biography, vol. i. p. 22.

† Theophr. de sign. pluv. p. 419, Heins.; Leake, Athens, vol. ii. 3.

> Εὖτ' ὄρεος κορυφῆσι Νότος κατέχευεν ὀμίχλην.
> Il. iii. 10.

The passage alluded to has been thus rendered by Pope:

> "Swift march the Greeks: the rapid dust around
> Darkening arises from the labored ground,
> *Thus from his flaggy wings when Notus sheds*
> *A night of vapors round the mountain-heads.*"

The south wind derived its Greek name from the fact of its carrying moisture (νοτιδας ἐπίφερει): this etymology is borne out by Liddell and Scott, who say that there was an original notion of *moisture* in the word from its derivative, *νοτὶς*, moisture. Greece, like our own islands, was bounded on the *South* by a large body of water, whose exhalations are soon drunk in by the thirsty air that is blown over the vast tract of land which Africa exposes to a tropical sun. So long as these heated masses of air maintain their temperature, the moisture they hold remains invisible, but so soon as they pass into a colder region their capacity for moisture is diminished, and condensation takes place: the rainy character of a southerly wind was so well observed in Greece, as it is in our own country at the present day. Mount Olympus, in Thessaly, was the culminating point of antient Greece, being 9700 feet above the level of the sea, and scarcely ever free from snow. Mount Guiona, since the northern part of Greece has been added to Turkey, is the highest mountain in modern Greece, its height only 8240 feet. In allusion to the above change that has taken place in the boundary-line of Greece, the Primate of Larissa remarked to Dr. Wordsworth, "What have we done, of what have we been guilty, that we should be excluded by the last general treaty from the limits of free Greece? Have we not striven side by side with our fellow-countrymen for the liberty which they now enjoy? Have we not resisted year by year the cruel violence of our present masters, and struggled to shake their yoke from off our necks? We, the inhabitants of the ancient Hellas—the cradle of Greece—are banished from our own country! Olympus is excluded, and with it the gods of Greece are exiled from Greece by four treaties! Look," pointing from the window, as he spoke, to the stream which flows beneath it, which was then very low, and to the mountains capped with snow beyond it, "the Penëus has wept itself almost dry, and Mount Olympus has grown old and hoary, for they are both exiles from their native land."* A few of the mountains only are covered with snow after the spring is over; some, however, retain their winterhood until the commencement of summer, and in those districts where the snow-capped mountains rear their lofty crests all the severity of winter may be felt, whilst the next region is enjoying the first balmy breezes of spring. In Bœotia there are frequent snow-storms until the middle of February, whilst Attica is at that time encompassed by a warm and genial atmosphere. The mountainous regions, therefore, as a general rule, are subject to severe winter, whilst the sea-coast is favoured in many parts by an entire absence of snow. "In like manner, in the month of March travellers find *midwinter* on the highlands, Mantineia and Tegea, in Arcadia; *spring* in Argos and Laconia; and almost the heat of *summer* in the plains of Kalamáta, at the head of the Messonian Gulf."* The effect of a lofty snow-clad mountain such as Olympus is often to produce a draught of air towards the valley, which does immense damage to the crops and greatly affects invalids. The warm air coming in contact with the snow, loses its heat and becomes specifically heavier, which altered condition causes it to roll down the sides of the mountain in the form of a most chilling torrent. On a small scale we experience the same thing in our large churches, whose windows being chilled by the cold air outside, reduce the heated temperature of the air in the interior, so soon as it comes in contact with the glass; whereon it first deposits the moisture which it no longer is able to retain, and then falls down with considerable force, producing a draught that is frequently a fruitful source of colds and rheumatism: however hermetically sealed the windows may be, this draught is sure to take place, and the only remedy for the evil is in having the windows doubly glazed in such a manner, that between the outer and inner panes there should be a stratum of air, which, being a bad conductor of heat, would not allow the air without to cool down the inner pane, which would soon become of the same temperature as the atmosphere of the interior, and therefore cease to throw it into currents.

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* Ἐπὶ Πλειάδι δυομένῃ ἐὰν λάμψῃ κατὰ Πάρνηθα, και Βριληττὸν, και Ὑμηττὸν ἐὰν μεν ἅπαντα καταλήψῃ, μέγαν χειμῶνα σημαίνεί, ἐὰν δὲ τα δύο, ἐλάττω· ἐὰν δὲ Πάρνηθα μόνον, εὐδίειον.—Theophrast. de sign. tempest. p. 438, Heins.

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* Op. cit. p. 289.

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* Dr. Smith, op. cit.

The Summer of Greece is generally hot, and the thermometer often indicates a temperature above 100° Fahr.,—which, however, is modified and rendered more tolerable by the sea-breezes. During the summer there is hardly ever any rain, and the small rivers, streams, and brooks become dry ; the sky then becomes cloudless for weeks together, and then that beautiful transparency of the atmosphere and brilliance of the sky reign which so much astonish the traveller from the North, whose eye has been accustomed to scan the bedimmed canopy of his own less genial home.

The Etesian winds, springing up a little before the Dog-days, have the effect of tempering and cooling the air. The Etesiæ are northerly winds, whose home, according to the antient poets, was the land of Thrace. Thus Horace speaks of them :—

> "Jam veris comites, quæ mare temperant,
> Impellunt *animæ* lintea *Thraciæ*."
> Car. iv. 12.

If, however, Greece during some portion of the year have its climate softened by the sweet breezes of summer, all its districts are not so happily circumstanced, for in many of them the cold mountain-draught and the hot gulf-blast fearfully affect both man and beast where these atmospheric contrasts prevail. Let us give as an instance the climate of the plains of Patra, in Achaia, which become intensely heated during the day, and then at night and early morning are subject to the cold current that rushes heavily down from the sides of Mount Voidhiá (Panachaieum). Here fever and dysenteries rage in the summer and autumn, and their origin is ascribed to the wind from the mountain, the people of Patra believing that its unwholesomeness depends upon its heaviness. The true cause seems to be, however, the great difference in the temperature of the day and night, which would assuredly engender a fever in persons exposed to the chilled air of the latter without being properly clad. Mount Voidhiá lies to the SE of the town of Patra, and therefore this wind is a specimen of a *land-breeze*. In the same town during July and August a *sea-breeze* is equally detrimental to the comfort and health of the inhabitants, for its violence and heat are so great that the windows are obliged to be closed by shutters all day in order to exclude the blast. New settlers are especially affected by this latter wind; to the French it proved exceedingly fatal about sixty years ago, when, before the revolution, they established some mercantile houses there. In addition to the winds above alluded to, Patra is rendered unhealthy by the marshes to its south and westward. Although cultivation of the plain may have done much, yet, as Colonel Leake justly observes, " the marshy spots still existing, acted on by a powerful sun, are a fruitful source of disease." By this gentleman Patra is only considered third in the scale of unhealthiness to Anapli and Corinth, both of which are situated under lofty mountains. The Castle of the Morea, situated on a point of land which with a similar one on the opposite coast forms the narrowest strait in the Gulf of Corinth, is surrounded by marshes; it is also protected by a wet ditch that communicates with the sea at either end of the triangular promontory of which it forms the base. Through the straits opposite the Castle the wind blows with terrific force, and does not seem to counteract the evil influence of the marshes, the effects of whose malarious exhalations are written upon the unhealthy countenances of the inhabitants.

The serene sky of Greece, with its splendid warm colouring that so many artists have striven to depict, and the gentle Etesian winds which have afforded the poet so many a metaphor, disappear soon after, or some time before, the harvest has been gathered in; the empty channels then become filled with rain, which falls suddenly in torrents, and, as in many parts of England, large tracts of land are inundated in consequence; the land covered being badly drained, the water remains stagnant, and then the heat of the succeeding summer, acting upon the sodden and decayed layer of vegetable matter, creates in the marshy wastes the most pestilential emanations, which produce a host of diseases.

> "Macies et nova febrium
> Terris incubuit cohors."
> Hor. Car. i. 3, 30.

Of the effects of marsh miasma Hippocrates was well aware; he instances the Phasians, whose country is marshy, hot, wet, and woody (*ἡ χώρη ἐκείνη ἐλώδης καὶ θερμὴ καὶ ὑδατεινὴ καὶ δασεῖα*: op. cit.), and subject to showers at all seasons; he gives a graphic description of their fruit and the people themselves, whom he describes as pale, bloated, indolent, and unwieldy, with deep voices (*φθέγγονταί τε βαρυτάτον ανθρώπών*), which he attributes to the mists that they breathe. The fruits, he remarks, are cramped, and, as it were, effeminated (*τηθηλυσμένοι*). In a former page we have described the effect of cultivation upon the diseases of a country. Greece, whilst inhabited by a free, industrious, and intelligent race, was cultivated to the greatest extent that its soil would admit of; thickly populated as it was in its prosperity, wherever the land would yield fruit it was made to do so; and we find that Herodotus considered that Greece possessed a most happily-tempered climate.* Some authors have considered that antient was more healthy than modern Greece, on account of some of the districts not being properly cultivated and drained, which neglected state is highly favourable for the development of the malarious gases that now pollute the air with their fever-germs. As to the climate being congenial to the intellectual energy of its inhabitants, which according to Aristotle it was,† we have only to look at the noble monuments that remain, both in the arts and in literature, to be convinced that either the psychical strength of the Greek was very great, and able of itself to contend against external circumstances, or that the climate was highly favourable to the healthy growth of the mental qualities which characterised those who lived and flourished under its influence.

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* Herod. iii. 106.

† Arist. Pol. vii. 691.

I have already alluded to the convulsions by earthquakes to which Greece has been subject, and the effect that these visitations have produced upon the limestone rocks of which its mountains and plains are formed. Strabo[*] called Laconia *εὔσειστος*, or "easily shaken," but Leake[†] says that earthquakes are not frequent there. The public buildings in a land subject to such concussion require to be built accordingly, and this difficulty has been a powerful cause in evoking the talents of the architect, and of estamping on the antient Greek an honourable distinction which the moderns, whether in Greece or any other European country, do not seem competent to despoil him of. Some buildings have stood the successive earthquakes of twenty-two centuries, without being injured. Aristotle has observed that these upheavings of nature occur frequently at daybreak, and that they happen in *spring* and *autumn*, when the atmosphere is tranquil.[‡] The buildings are so contrived as to be either very light or very solid, both extremes being safe modes of construction. In this hasty sketch of the climate of Greece, I have endeavoured to trace its effect upon the minds and bodies of its inhabitants. We have seen that this celebrated country embraces within its boundaries every physical and climatic condition that is necessary to call forth the energies of her sons. The wild and often impassable coast has raised a hardy set of mariners. The plains and mountains of Bœotia and Thessaly have tutored the shepherd and the hunter in everything that gives prowess in bodily vigour. The thin, bright, elastic air of Attica has smiled upon the brains and nerves of the Athenian, and the mind, that in the neighbouring Bœotian climate would have desired only to excel in the palæstra, under its genial influence was made to delight in everything intellectual. The Greek mind, however, often rose superior to the circumstances under which it was placed, and thus we find that even the thick air of Bœotia was insufficient to paralyse the mental energy of Hesiod, Corinna, or Plutarch. Everything seemed at one time to thrive in Greece, like seeds sown in a virgin soil. The arts, sciences, and literature sprang into luxuriance from the rich soil of the Grecian mind, encouraged as they were by every variety of climate, which, instead of only being fit for the development of a single excellence, was adapted for all; and although the full combination may not have been found in one region or one city, yet Greece, as a whole, comprehended all the conditions, both physical, mental, and climatic, calculated to evoke all that the mind of man contains.

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[*] Strabo, viii. p. 367.

[†] Morea, vol. i. p. 341.

[‡] Meteor. lib. ii. c. 8.

In our own country can we not see the difference between men inhabiting a low marshy soil, and those who are fortunate enough to pursue their calling in a dry invigorating air? Men, again, are indirectly affected by the kind of cattle over which they watch; and as climate and geological formation influence the one, so do we find it indirectly a powerful modifier of the habits of the other. The swineherd is a totally different man from the jockey. Some climates are favourable only to horses, whilst others encourage the breed of sheep and oxen; and as man is an ubiquitous animal, so must we expect to find him modified according to the circumstances under which he has been placed in the fulfilment of his mission,—the guardian of himself and the creatures over whom he reigns, and whose services have been placed at his command. We have seen how much the geological formation of a country has to do with its climate. I therefore think that it is but fair to bracket these two grand modifiers of man together, and thus study them. A knowledge of geology is undoubtedly necessary for the physician, and this is inseparable from the natural history of a country, when we consider how the fauna, the vegetables, the minerals, the waters, vary with the earth's crust whereon man takes up his abode, more frequently from compulsion than the still small but persuasive voice of instinct, which acts as a safe guide to the brute, whom the Creator will not allow to be subject at all times to the erring will of man.

In accordance with the plan that I have hitherto adopted throughout this work, I shall place a Table of the Pestilential Constitution described by Hippocrates as a text at the head of those remarks that I intend to make in reference to this subject, of which, however, I must premise, a mere sketch is all that I shall attempt, for to do more, even were I able, would swell my pages beyond the limits of my original design. (For Table, see pp. 110 and 111.)

In estimating the aptitude of a locality to produce or favour any particular epidemic, something more than the mere natural climate must be taken into consideration; for, from what has been said before, it will easily be imagined that the habitations of man exercise a material influence on the supernatant air of a district, especially during the prevalence of calms, when whatever rises from them accumulates and concentrates in such a manner as seriously to affect the health of those who inhale the poisoned atmosphere. The site of Athens, situated as it was on a soil dry and friable, having the effect of keeping the air free from redundant moisture, which was the main feature of this delightful climate, and afforded such a strong contrast to the misty air of Bœotia,—did not in itself contain the necessary conditions for producing a severe epidemic, like the Sunderbuns in India; but so soon as man fixed upon this district as his abode, and built thereon ill-constructed and ill-drained houses, traversed it with streets which, from their narrowness and overhanging houses that bordered them, were dark and moist, then did this hitherto healthy spot become a nidus for pestilence to be nurtured in, and too frequently a resting-place for other vagabond epidemics which came from afar, where they had racked out the atmospheric soil and left desolation in their track.

The diseases that prevailed during this constitution were the following:—*Erysipelas* in several forms; *fevers*, ardent, remittent, and intermittent; *furunculus* and its allies, *consumption*, *inflammation of the tongue*, and an *aphthous state* of the lining

PESTILENTIAL CONSTITUTION. (Κατάστασις Λοιμώδης.)

Season.	Rain and Moisture.	Wind.	Temperature.	Cloud.	Snow.	Diseases, remarks, etc.
Autumn.						
Περὶ ἀρκτοῦρον. A few days before the *Autumnal Equinox.* Φθινόπωρον.	Much rain. ὕδατα πουλλά.	South. ἐν νοτίοισι.				
	Abundance of wet. ὑδάτων πλῆθεα.			Gloomy and cloudy. σκιώδες, ἐπινέφελον.		
Winter.						
Χειμὼν. After the *Solstice* and near the *Equinox.* Μετὰ δὲ ἡλίου τρόπας ὕστερον πολλῷ, πλησίον ἰσημερίης.	Damp. ὑγρός.	Southerly. νότιος.	Mild. μαλακός.			Consumption commenced in many cases.
About the *Equinox.* Περὶ ἰσημερίην.		Northerly. βόρεια.	Much winterly weather. ὀπισθοχειμῶνες.		Snow, that lasted no long time. χιονώδεα οὐ πολὺν χρόνον.	Causus and phrenitis were prevalent now, just as the cold weather set in.

Spring. ῞Ηρ.	Much rain until Dog Days. ὕδατα πουλλὰ διὰ τέλεος μέχρι κυνός.	Southerly and calm. πάλιν νότιον ἄπνοον.				A dreadfully malignant epidemic of *erysipelas* (ἐρυσίπελας) reigned, which seized all kinds of cases, and was both traumatic and idiopathic. It destroyed the skin, tendons, and bones: all parts of the body suffered: limbs were laid bare, and were said to drop off. Legs, arms, groins, chest, and sides, were all laid bare. The mortality was great.
Summer. Θέρος.		Southerly and calm. νότιον καὶ ἄπνοον. The Etesian winds blew slightly and irregularly. ’Ετησίαι σμικρὰ διεσπασμένως ἔπνευσαν.	Hot. Θερμόν. Much suffocating heat. πνίγεα μεγάλα. Suddenly hot. ἐξαιφνης θερμόν.	Serene, fine. αἴθρόν.		*Erysipelas* continued. *Carbuncles* (ἄνθρακες), *putrefaction* (σῆψ), and all kinds of *fevers*, *pharyngeal affections*, *ecthymata*, *herpetic eruptions*, and *cholera*. This season was most favourable to *consumptive* cases.
Autumn. Περὶ ἀρκτούρον.	Much rain. ὕδατα πουλλά.	Northerly. ἐν βορειοίσι.				*Erysipelas* continued. *Consumptive* cases terminated fatally. Those, for instance, who were seized in the preceding winter died. During the Pleiades many of these cases were cut off.

of the mouth and throat; *abscesses* in the groin and other parts; *dysentery*, and other complaints of the *bowels*, *stomach*, and *urinary organs*; all of which were of an *asthenic* character. The *spring* was the season most fatal, the *summer* the least so; but during the *autumn* the quartan fevers were said to have carried off a great number. It will now be necessary to take these diseases separately, and observe the relation that they bore to the coincident meteorological phenomena, which will be found grouped against the several seasons in the foregoing Table.

Erysipelas (Πολλοῖσι μὲν τὸ Ἐρυσίπελας: Epid. liv. iii. § 4; Litt. t. iii. p. 70.)—This was the disease that was most remarkable during the constitution, which we are now discussing, and as the description of it by Hippocrates cannot be read without interest, I shall here subjoin it; and when, a little further on, we have occasion to mention other pestilences, it will be a point for reference.

Description of the Epidemic Erysipelas of Hippocrates.—"In the beginning of the *spring*, coincident with the presence of the cold weather, there were many cases of erysipelas: some had, whilst others had not, an [apparent] cause; they were of a malignant character, and killed many. * * * * Erysipelas attacked many persons on slight occasions, and on account of the commonest and most trivial wounds, indiscriminately all over the body, especially of patients about *sixty years* of age; [it attacked also] the head, and if the slightest wound were neglected, and even in many cases whilst under treatment, severe inflammation took place, and extensive erysipelas quickly spread everywhere. In most of the cases the swellings suppurated; [followed by] great discharges of flesh, tendons, and bones. The discharge that attended [these sloughings] was not like matter [pus], but was another kind of putrid humour; it was both plentiful and variable. In those cases where it attacked the head, the whole of the hair fell off from both the scalp and the chin; the bones were exposed and exfoliated, and there was profuse discharge, and this both with and without fever. These things, however, were more dreadful than dangerous, for wherever suppuration was properly brought about, the majority were saved; on the other hand, where the inflammation and erysipelas supervened, but produced no such abscess, many of the patients were destroyed. The same course was run by this disease in whatever other part of the body it might wander; in many the arm and the whole of the fore-arm were laid bare. In some, where they assailed the ribs, these things took place either in front or behind; in others a whole limb, or the coverings of the leg, or even a whole foot, were laid bare. But the worst of all these cases were those wherein the pubis or the genitals were the seat of this disease. Such things thus occurred [when erysipelas attacked persons in consequence] of ulcers, or any other cause; many suffered from [this epidemic] during fevers, before fevers, and after fevers. But in such cases, if the abscesses suppurated, or a favourable evacuation of the bowels, or a discharge of well-conditioned urine, supervene, convalescence takes place; but if, on the contrary, none of these things happen, and the [erysipelas] disappear without a token, the cases terminate fatally. Erysipelas was most prevalent during the *spring*, but it continued through the *summer* until the *autumn*."

Such is the brief description of this dreadful epidemic, which appears to have been *gangrenous erysipelas*,—fortunately, a form that does not often present itself among us. I shall now make a few remarks upon erysipelas in general, so far as its statistics, &c. are concerned, and compare them with what Hippocrates has observed and described.

The Season most favourable to the development of Erysipelas.—The year 1838 was characterised by its low *temperature* throughout, and its more than average moisture, although the quantity of rain that fell in the metropolis was 2½ inches less than the average amount between the years 1826-35; the general annual fall being about 24 inches. The mean temperature of January was 4° below the freezing point; while, on the average of the ten years 1826-35, it was 4° above the freezing point. The effect of this cold and moisture on the vegetation was very deleterious, and led Professor Lindley to remark "that the winter of 1837-38 was in England more injurious to vegetation than any which has occurred in modern times, and it must be many years before its disastrous effects can be repaired under the most favourable circumstances" (Farr*). On referring to an account of the deaths from erysipelas for this year, we find that during all the four seasons their number was considerably above the average, and that it was more fatal amongst males than females; the numbers being—*Winter* 36°: males 57, females 49; total 106. *Spring* 53°: males 57, females 48; total 105. *Summer* 61°: males 48, females 45; total 88. *Autumn:* males 61, females 45; total 106. The epidemic erysipelas recorded by Hippocrates is an instance of a pestilence breaking out and being most virulent during the *spring*. Of course the history of disease in our own isles will afford us similar examples:—take, for instance, the epidemic small-pox that raged from the summer of 1837 until the end of 1839, and which was at its acme during the *spring* of 1838, when 4489 deaths took place. But perhaps the severest visitations with which England has been plagued have fallen upon its inhabitants during the *summer*, which the annexed table will prove.

Table of Deaths in London out of 100 Living.

	Plague Years. 1593-1603, 1625-1636, 1665.	Intercurrent Years. 1606-10.	1838.	1849. Annual Mortality per cent. Cholera Year.	1854. Annual Mortality per cent. Cholera Year.
Winter	1·7	1·4	·85	3.008	2.938
Spring.........	2·0	1·5	·70		
Summer	16·3	2·1	·60		
Autumn	5·0	2 0	·66		
Annual Mortality per cent.	25·0	7·0	2·81	3.008	2.938

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* Letter to Registrar-General, June 1840. 2nd Ann. Report, 1840.

Although at page 86 I have stated that, as a general rule, the season between winter and spring is the period least favourable to the development of *typhus*, it must be remembered that the epidemic of 1837-8 reached its height in the metropolis during the *winter* of the latter year, when the number of deaths registered were 1285, or 91·12 as the weekly average. The *spring* of 1838 was also characterised by the immense number of deaths which took place from *small-pox* throughout the country. This disease, as we have seen before, is more prevalent during the cold seasons, the wave of its virulence subsiding towards the *summer*: consistent, then, with its usual course, the wave ascended from the *summer* of 1837, reached its greatest height in the *spring* of 1838, dipped towards the succeeding *summer*, and again rose during the next season to pursue a similar but more depressed course in 1839.

*Small Pox.**	1837.		1838.				1839.			
Seasons.	Summer.	Autumn.	Winter.	Spring.	Summer.	Autumn.	Winter.	Spring.	Summer.	Autumn.
Deaths.	2513	3289	4242	4489	3685	3851	2982	2505	1533	1730
Typhus.† Deaths.	826	1107	1285	1176	829	788				
Erysipelas. Number of Deaths in metropolis, 1838 ...			106	105	88	106				
Total number of Deaths registered during 1838 in the metropolis			15,611	13,109	11,397	12,581				

From the above tables the reader will easily perceive that the year 1838, like the one described by Hippocrates, was most fatal in the early seasons of the year. By the calculations deduced from the bills of mortality that were published during the plague years, it will be observed that the *summer* exceeded greatly the other seasons in the amount of mortality from pestilence. Cholera seems to follow in the footsteps of its more dreadful predecessor the plague, for we find it visiting us during the *summer* months principally; although experience has taught us that this hardy disease will live in all seasons. Mr. Farr, in his interesting letter above alluded to, quotes the observation of Celsus, "Saluberrimum *ver* est; proxime deinde ab hoc, *hiems*; periculosior *æstas*; *autumnus* longe periculosissimus," which, he says, was precisely the order during the *plague years*. His explanation is as follows:—"This order of salubrity, still observed in Rome, and in the towns on the shores of the Mediterranean, might be ascribed to the climate, if it had not formerly obtained in London and other cities on nearly the same isothermal line. Julius Cæsar placed the middle of spring, summer, autumn, and winter, at the equinoxes and solstices; and according to this arrangement of the months, in which winter dates from November 11, the relative mortality of the seasons in London was—winter 26, spring 16, summer 44, autumn 163, in the five plague years of the seventeenth century; and in five intercurrent years the mortality was—winter 17, spring 14, summer 15, autumn 24."*

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* Throughout the kingdom.

† In the metropolis.

In a former page I have remarked how the deaths from pulmonary diseases swell out the bills of mortality, and how the crest of the disease-wave reaches its maximum altitude during the winter and spring months, which state of things, in a country like ours, where chest complaints are so common, undoubtedly annihilates all claim on the part of the spring to be *saluberrimum*,— unless, perchance, it may be so comparatively when some dreadful scourge sweeps off its thousands of victims during the summer and autumn, like the plague of old, and the cholera of the present century. Such an order of relative salubrity as was remarked to subsist by the antient Roman physician, seemed to indicate that the climate where the observations were made was one in which pulmonary diseases did not take a prominent part.

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* Op. cit.

The year 1848 was one in which erysipelas was particularly fatal in London, 579 deaths from this cause having been registered. The preceding year was also remarkable on the same account; the number being only 54 less. The comparison is made between these two years and the thirteen others which are included between the end of 1839 and 1854; during these two years the storm of epidemics was brewing which broke with such fearful force in London during the summer of 1849.

The following statistics of erysipelas seem to bear out the Hippocratic observation that it is a disease of the *cold seasons*:—

	Winter.	Spring.	Summer.	Autumn.
Average of Ten Years ...	101·	87·	79·	98·
Weeekly Average.........	7·10	6·9	6·1	7·7
1848	195	129	128	126
1849	127	113	99	109
1854	96	115	109	128
	418	357	336	363

Although the seasons of individual years may vary slightly in their order, yet there are a sufficient number of facts to show that *erysipelas* is most prevalent in the metropolis during the *winter* and *spring*, that it is least so in the *summer*, and that it begins to rise again during the *autumn*. We shall now proceed to

The Meteorological Conditions conducive to Erysipelas.—From the fact that erysipelas is a disease which is most fatal during the cold seasons, we may suppose that a reduction of temperature, and the other attributes of winter and spring, are conducive to its development; and such, in fact, is the case, for we find that exposure to *cold* and *moisture* is one of the most frequent atmospheric causes. The year in which the gangrenous form took place is described by Hippocrates as being excessively *damp*, and the season that preceded the one in which this complaint began to rage was very *winterly*; the air was also *calm* and *stagnant*, and thus became loaded with emanations from those who had already been attacked. We have already seen that the year 1838 was remarkable for its *coldness* and *humidity*, and its excess of deaths from erysipelas. The year 1848, in the winter quarter of which the number of deaths in the metropolis rose to 195, nearly double the amount of the average, was *southerly*, and distinguished by a *large fall of rain*, which coincides exactly with the observations contained in the table at pp. 110 and 111. The winter quarter of the present year, 1855, is remarkable for the excess of deaths from erysipelas, and we must attribute it to the very low temperature that has characterised the three first months of the year. The year 1848 must be considered a *pestilential* year, for in many parts of England the cholera had begun to show itself. Of erysipelas there died 3616, of cholera 1908, of diarrhœa 11067.

The contagiousness of erysipelas has been acknowledged from the most remote period of the history of medicine, and this character is what renders it so fearful a disease when it presents itself either in a hospital or a prison. During the months of winter and spring, when the windows and doors of the wards are kept closed in order to keep out the external penetrating easterly wind, the atmosphere thus pent up gets loaded with animal emanations, is thus rendered poisonous, and soon begins to show its virulent character if any of the patients be unfortunate enough to have ulcerated surfaces. In the year 1848 it attacked the cases in some of the London hospitals that had been operated upon, and often with fatal results; at the same time hospital gangrene and peritonitis (of a low form) after operations for strangulated hernia occurred. In some parts of

Scotland it raged with unexpected severity, attacking almost every wound, however slight. At Inverness, for the last nine months of the year (1848), erysipelas was very prevalent. The application of a blister, an irritating liniment, or a wound, however trifling, were, in five cases out of ten, sure to be followed by this disease. Many persons died of erysipelatous sore-throat and inflammation of the lungs, all unyielding to depletive remedies. In the infirmary of that town, the dread of erysipelas was so great for a considerable time as to deter many persons from entering it.* By some it has been thought that the epidemic described by Hippocrates was identical with the pestilence that afflicted Athens in the time of Thucydides. Certainly this physician was then alive, and probably about thirty years old, but had he been a witness of such a disease he most certainly would have recorded it:—in all probability the year in which the plague occurred was a pestilential one, and capable of producing several epidemics, which varied with the locality in which they raged. In England, whilst cholera was devastating some districts it was absent in others, when typhus or some other equally fatal scourge thinned the population: so might the plague have raged at Athens, and gangrenous erysipelas coincidently at Thasos, or wherever Hippocrates was practising at the time. The distance is so short between Greece and Egypt, where the plague is by some considered endemic, that a southeasterly wind could soon bring the dreaded scourge to its shores; thus Thucydides,† in his masterly account of the plague at Athens, traces it from that part of Ethiopia that lies above Egypt, to Persia, Lemnos, the Piræus, and thence to Athens. It appeared in the *winter* of the second year of the Peloponnesian war, which was the second or third year of the eighty-seventh Olympiad, B.C. 430.

Carbuncles (ἄνθρακες) also were noticed to be common; and it may be well just to make a few remarks on the disease now called by that name,—especially as it has increased of late years: thus the total number of deaths in the metropolis from this cause stand in the following order:—1840, 2; 1841, 1; 1842, 5; 1843, 6; 1844, 5; 1845, 9; 1846, 3; 1847, 15; 1848, 20; 1849, 15; 1850, 19; 1851, 19; 1852, 50; 1853, 70; 1854, 91. Now this disease, we see, seemed to make a sudden leap at the approach of the pestilential year 1848, and to have gradually increased the number of its victims until the cholera year of 1854, when 91 deaths were registered, the order of which, according to the season, was as follows:—*winter* 25, *spring* 25, summer 19, autumn 22. Whether this disease has an epizootic origin, or whether it is dependent for its development upon certain atmospheric combinations, or whether the system has become more prone now than heretofore to throw out morbid matter in the characteristic form of a carbuncle or boil, is a subject which I cannot enter upon here, for I have not sufficient facts before me to warrant me even in giving a most general opinion in the matter.

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* London Journal of Medicine, No. 1, p. 115.

† Lib. ii. § 47.

With this introduction I shall now proceed to make some remarks on the Table, in which I have grouped all the characteristic meteorological phenomena mentioned by Hippocrates as having been observed during the fatal year whose melancholy history he has so well and beautifully told.

We find, on referring to the above Table, that four out of the five seasons which it comprehends were characterised by *copious rains*, *southerly wind*, a *cloudy sky*, and a *gloomy* state of the atmosphere; and that, after the winter solstice, the weather, instead of being *fine* and *clear*, was *winterly* and *out of season*, and thus ushered in the *spring*, which, in this pestilential year, was so fatal a season.

I will now analyse the Table, and in doing so I think it will be the best place to discuss the several phenomena separately, instead of treating them generally.

Previous Seasons.—Hippocrates, we must remark, was not content with merely giving a description of the condition of any one particular season in which an epidemic prevailed, for full well did he know that much depends upon the state of the seasons that precede those in which any peculiar disease shows itself. Epidemics require time to become matured, and their development is often going on at a time when we least suspect it, simply because we do not see any cases of it. By and bye it is, however, to be hoped that a more extended study of meteorology in its relation to disease will teach the physician what class of epidemics to expect, and thus, being "forewarned, he will also be forearmed." It is highly necessary, in writing the history of a particular constitution, to take into consideration the state of several of the preceding seasons, for, without doing so, we should be often at a loss to account for the occurrence or increase in the number of many diseases, which might otherwise be well accounted for by a reference to some of their more salient meteoric antecedents. The effect of the seasons upon vegetation is also worthy of especial attention, so well as the appearance of certain insects, which are often not only the forerunners of disease among plants, but too frequently harbingers of ill to man.

> "For oft engendered by the hazy north,
> Myriads on myriads insect armies warp
> Keen in the poisoned breeze; and wasteful eat
> Through buds and bark, into the blackened core,
> Their eager way. A feeble race! Yet oft
> The sacred sons of vengeance; on whose course
> Corrosive famine waits and kills the year."[*]

Rain, Moisture, and the South Wind.—We shall consider these three characters of the "Pestilential Constitution" together, inasmuch they are so frequently inseparable companions.

The South Wind (Ἔτος νότιον, ἔπομβρον.[†])—The Table at page 110 shows at a glance that this direction of the wind was prevalent during the preceding autumn and early part of the spring in which the epidemics appeared. This south wind, perhaps, had much to do with the pestilential character of the year; and we see on comparing the Tables of the Second and Third Constitutions, that in those years the *north* wind was the prevalent one,—and even in the First Constitution, where there is the appearance of a *southerly* tendency, yet that the year was preceded by an opposite and *northerly* state of the weather. It must be remembered that the *Etesian winds* are *northerly*. The *south* wind hardly ever gets a good epithet, either from the poets or prose writers of antient times. Aristotle* says that it is a moist and heavy wind (ὑγρὸς γὰρ καὶ βαρυς ὁ ἄνεμος); and Pliny† uses nearly the same words: "Austro humido scilicet et graviore vento." Horace calls it "plumbeus Auster;"‡ and Ovid,§ in his description of the plague that devastated Ægina, mentions this wind as prevailing at the time:—

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[*] Thomson's Seasons—"Spring," line 119.

[†] Epid. iii. 3.

> "Letiferis calidi spirârunt flatibus Austri."

I will now endeavour to trace the *south* wind in its various relations to the epidemics both of the countries of the northern boundary of the Mediterranean and of the western parts of Europe.

The plague is said to be endemic in Egypt; and Fodéré‖ says "that there only is it engendered; and that in other regions it is always an alien." It will be also found related by Dr. Joseph Browne,¶ that "the vernal equinox is the period of the greatest fatality of the disease [plague]. About this time, we learn, *southerly* winds blow with great violence; they last ordinarily three or four hours, and are frequently renewed daily for fifty successive days. They are very warm, passing over the burning deserts which border Egypt in the south, and they are moreover loaded with putrid emanations exhaled from the animal and vegetable substances which are decomposed in the lakes formed by the retiring of the waters of the Nile, or in the cemeteries which its inundations have reached." Such being the starting-point, should the wind prevalent in Greece and in the northern regions above it have a *southerly* tendency, this pestilential *south* wind would find no difficulty in blasting with its poisonous breath the inhabitants of the Mediterranean islands and their northern neighbours. Thucydides, as we have seen above, in his account of the plague at Athens, traces it in a south-west direction to Persia, and thence in a south-east one to the island of Lemnos, the Piræus, and Athens.

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* Lib. viii. Hist. cap. xv.
† Lib. x. 33.
‡ Ser. ii. 6.
§ Met. lib. vii. line 332.
‖ Dict. des Sc. Méd. vol. xli. p. 87.
¶ Encyc. of Pract. Med. vol. iii. p. 332.

But we must not draw too hasty a conclusion with regard to the wind being the means of conveying epidemics from one country to another: although, combined with the presence of other causes of disease, it might be instrumental in bringing about a pestilential state of the atmosphere, yet, for the spread of the plague and other epidemics we must look to the communication that takes place between one nation and another for the most important means of propagation. On this subject Hecker* remarks, in reference to the great plague of 1348—"The corruption of the atmosphere came from the east; but the disease itself came not on the wings of the wind, but was only excited and increased by the atmosphere where it had previously existed. This source of the black plague was not, however, the only one; for far more powerful than the excitement of the latent elements of the plague by atmospheric influences, was the effect of the contagion communicated from one people to another, on the great roads, and in the harbours of the Mediteranean. From China, the route of the caravans lay to the north of the Caspian Sea, through Central Asia to Tauris. Here ships were ready to take the produce of the East to Constantinople, the capital of commerce, and the medium of connection between Asia, Europe, and Africa. Other caravans went from India to Asia Minor, and touched at the cities south of the Caspian Sea; and lastly, from Bagdad through Arabia to Egypt; also, the maritime communication of the Red Sea, from India to Arabia and Egypt, was not inconsiderable. In all these directions contagion made its way; and, doubtless, Constantinople and the harbours of Asia Minor are to be regarded as the foci of infection, whence it radiated to the most distant seaports and islands.

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* Epid. Midd. Ages, Syd. Soc. ed. p. 19.

To return, however, to the *south* wind, we must consider it more as the cause or concomitant of warm mild weather, than as being pestilent in its very nature; and from this point of view must we study it. With the south wind, therefore, have we associated *heat* and *moisture;* the former of which, according to Galen, is the active, and the latter the material cause of putrefaction. Throughout the writings of the many distinguished physicians who published essays on the plague, sweating sickness, influenza (epidemic catarrh), &c., we find several valuable meteorological observations, which will be interesting in this place, and tend to show that however varied the symptoms and signs of an epidemic may be, yet there is a certain constancy in the appearance of certain atmospheric phenomena. I must again refer the student to the above Table, whilst I enumerate a few of the many remarkable facts recorded in the history of epidemics.

The first visitation of the Sweating Sickness in England was in the beginning of August 1485, the year in which Richard III., the last king of the Plantagenet dynasty, was slain in the battle of Bosworth, and the Earl of Richmond was proclaimed king as Henry VII. The years from 1480 to 1485 were *wet* years. This dreadful disease was swept away January 1st, 1486, by a south-east wind. The *humidity* of the year 1485 was remarkable, says Hecker, throughout the whole of Europe; the *rain* fell in torrents, and *inundations* were frequent. He observes that *damp* weather is not prejudicial to health, if it be merely temporary; but if the *rain* be excessive for a series of years, so that the ground is completely saturated, and the mists withdraw baneful exhalations out of the earth, man must necessarily suffer from the noxious state of the soil and atmosphere which, under these circumstances, must inevitably follow.* The second visitation of the sweating sickness took place in 1506, which year was preceded by the *wet* summer of 1505, followed by a severe winter."

In 1510 the Influenza broke out, which, according to Dr. Short, had for its precursor "a long *moist* air." The appearance of this epidemic in 1557† was after the prevalence of continued *wet* weather, of which the same author writes:—"1557.—This year and last was a great scarcity of corn from the *past great rains*. It was a very unseasonable year in England: all the corn was choked and blasted, the harvest excessively *wet* and *rainy*." There were also ill-smelling fogs at the time. In short, to quote the summary of Dr. Theophilus Thompson's compilation from the authors on Epidemical Catarrh, we find that the visitation of 1580 commenced in October, after a cold dry wind preceded by two or three years of "a *moist, rainy, southerly* constitution."

That of 1675, after a pungent *fog* and cold *moist* weather.

In 1710 the Influenza reappeared, "during a *moist southerly* constitution."

In 1729, "after a *rainy* November with *high tides*."

In 1732-3, "during a *damp* chilly spring, *southerly*, and fetid *fog*."

In 1737-8, the influenza commenced in November, when, Huxham says, "a *southerly* wind indeed *damped* the month."

In 1743, "during the three months preceding the attack of influenza, the atmosphere was for the most part *moist* and *damp*, and a stinking fog in January." Dr. Millar observed, with regard to the epidemic of 1758, that "October was very cold and *moist*, and that a great quantity of *rain* fell."

In 1762, Dr. Pretty observed that after the drought there were "great gluts of rain." The influenza of 1775 "prevailed during a *wet* autumn." In 1782 it appeared after the summer in 1781 having been very dry, the autumn very *rainy*, the spring of 1782 remarkably late, then gloomy, cold and *humid*, with occasional dry fogs and peculiar storms." During the epidemic of 1803, the three months February, March, and April, were for the most part cloudy, *showery, foggy*, and rainy. The epidemic of 1836-7 succeeded disastrous gales, the drifting of the snow, and the *floods* by the *thaw*. The year 1836 was remarkable for the number of days in which the *south-west* wind blew. The mean for the seventeen years from 1826 to 1842 inclusive was found by Daniell* to be 79·8 days, whereas, during this year, the number of days in which this wind prevailed was 126. The amount of rain for the same year was also above the average (24·16 inches); the quantity that fell at Chiswick when the observations were made being 28·73. In the following year, however, the *rain* was not so abundant, 19·88 inches only being registered: but the wind which prevailed was the *south-west*. From the above facts the reader will be able to draw his own inferences; and I think he will be satisfied that a southerly wind does seem to merit a great deal of the odium that the antient writers used to attach to it. The necessity of observing the constitution of *previous* years and seasons was well appreciated by the older physicians, who, from their more intimate acquaintance with the writings of the Fathers of Medicine, were led to adopt the judicious mode of observation which the writings of Hippocrates prove that he adopted.

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* Op. cit. p. 187.

† The year in which Calais was taken by the French.

Celsus wrote thus with regard to the weather of foregoing days: "Neque solum interest, quales *dies* sint, sed etiam quales antecessserint."† The aphorism would hold equally good if we substitute *anni* for *dies*. The prevalence of the *south-east* wind was observed to be particularly favourable to the increase of Cholera and Influenza; and Dr. C. J. B. Williams‡ cannot but think that this had some connection with the general tendency exhibited by the former to spread chiefly from *east* to *west*. He asks this question: "Has the morbific property of this wind aught to do with the *haziness* of air when it prevails,—a haziness seen in the country remote from smoke, and quite distinct from fog? What is this haze? In the West of England a hazy day in spring is called a blight." During the cholera epidemic of 1854, the *south-westerly* winds and *calms* prevailed, as will be seen from the following analysis. From the 28th week of the year (ending July 15th) to the 49th (ending December 9th) the deaths from cholera rose from five in the week until they amounted to the maximum during the 36th, after which they gradually declined until they again were reduced to five in the 49th week: within this period 22 weeks are included, during *fourteen* of which the *south-west* prevailed: the remainder were characterised thus:—one, east-north-east; one, *north-west* and *south-west;* two, *north-east;* three, *variable;* and one, *north-east* and *south-west*. Out of these twenty-two weeks, there were *twelve* in which *calms* prevailed, and during many of the rest there were several *calm* nights and days.

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* Meteorological Essays, vol. ii. p. 339.

† Celsi Med. lib. ii. cap. i. p. 36, Milligan.

‡ Princip. Med. and Pract. of Medicine, p. 42, foot-note.

The Calm that prevailed throughout this pestilential constitution is another characteristic: ἄπνοια διὰ τέλεος—there was a calm throughout—observed Hippocrates. This absence of wind has been observed during the prevalence of cholera. Mr. Hingeston, in his highly interesting papers, in the Association Medical Journal, lays stress upon the fatal *calm* that reigned during the visitation of the cholera in 1832. Conjoined with this fearful atmospheric *stillness* was that seemingly interminable *moistness* that was suspended for such a length of time over our ill-fated island. Even the most indifferent observer could not help remarking how *gloomy* and *cloudy* the weather was,—a state of the air that was either associated with or dependent upon the *calm*. Hippocrates observed the same phenomena, and noted them down in his description of this pestilential year (φθινοπωρον σκιῶδες, ἐπινέφέλον). Amongst many other remarks, Mr. Hingeston observed that in 1832 the weather was *gloomy* and cloudy, and during the cholera of 1854 that the *barometer* was *high* and the sky *overcast:* " a *calm* prevailed." In 1849 he says that " there were sixty *misty* days between 1st of January and 31st of August, *i. e.* one-fourth of the whole;" and from his observations made in 1854 at Newcastle, he found that "the cholera was the worst when the *barometer* was highest and the atmosphere *calmest.* There was on this occasion, as on former ones, a certain grey *mist,* which painters express by the word *scumbling;* and although it is remarkable that the atmosphere is, during the prevalence of cholera, at once both *calm* and *overcast,* and the roads *dry* if not dusty, yet there is a sticky moisture that pervades everything." In the Association Journal of 1854 (p. 1016) the following remarks were published by the gentleman whom I have just quoted :—" The *calm* that prevailed throughout the worst period of the disease (cholera) is denoted by the figures in columns nineteen to twenty-two in the Meteorological Observations of the Royal Observatory; on reference to which it will be seen that in the second week of September, when cholera was at its worst, it was represented by 195; whereas in the last week of August it had been 835, and in the fourth week of September, when ' cholera was slowly retreating from London,' it rose to 1045. The calm that was the greatest was the worst; and the disease began to decline as the wind rose. If we examine the columns denoting the pressure of the wind in lbs. on the square foot, we shall find that between August 19th and October 21st it was, with very few exceptions, at zero. In the same space of time there were thirty-two days marked as *calm,* which means that it was absolutely so; but if, according to my own careful observations, we were to double that number, we should scarcely be wrong in the general acceptation of the word; that is, nearly the whole period was a *calm,* or at the most only a *light* breeze. The exceptions to this oppressive state of the atmosphere were October 20th, 19th, and 18th, the 8th, 7th, 5th, and 4th; September 23rd, when the cholera began to decline, the 20th, 19th, and 16th, when there were some stiff breezes from the south-west. Except these days, amounting in all to not more than ten, all the rest of the time has been a calm, frequently a dead calm, with what sailors call *cat's paws* along the surface of the stagnant ocean." The peculiar *gloominess* and *calm* state of the atmosphere I observed at Bridgewater in 1849, when that town was visited by the cholera. Homer, in his short account of the plague with which Apollo afflicted the Greeks, in answer to the prayer of his priest Chryses, remarks that it was ushered in by a *gloominess* resembling night :

> ὁ δ' ἤϊε νυκτὶ ἐοικώς (Il. i. v. 47).
>
> "Breathing revenge, a *sudden night* he spread
> And *gloomy* darkness rolled about his head" (Pope).

In the above remarks, mention has been made of *stinking fogs* as coincident with several epidemics; and although it will not do for me to enter fully upon this subject, inasmuch as it does not strictly belong to our text, yet in connection with it we may remark that certain epidemics have been supposed to have had a peculiar *scent* belonging to them. Lord Bacon, for instance, states that "the plague has the *scent* of the smell of a mellow apple." Dr. Copland, as quoted by Dr. Williams,* relates that three persons were struck dead by the *smell* of the blood during the plague. When the cholera raged at Bridgewater in 1849, I myself could smell, on coming into the town from the country, a peculiar sickly odour; and I found that it was always more powerful in those districts of the town where the epidemic raged most; and it was often, to my sense at least, almost intolerably strong where three or four cases were huddled together to die in one room. As the disease shifted from one quarter of the town to another, I often observed the presence or the absence of this sickening effluvium. Moreover, on being called to a patient suddenly, and of whose disease I had not been apprised by the messenger, on entering the room, and sometimes on going up stairs, this peculiar odour has often led me what to expect. I have also heard it related by Captain James Gordon, who had lived in India for many years, that during a long journey on horseback with some brother officers they were dissuaded from baiting their horses at a certain station, although fatigued, because one of the company recognised a "smell" that he remembered to have observed in a cholera-hospital some very long time before: without making any inquiries, they pushed on to the next station, and there were informed that the cholera was raging fearfully at the one that they had just passed through. Such a fact as this tended to confirm their belief that the cholera really has a peculiar odour attendant upon it; for none of the party were aware until then that this disease was in the district at all. During the time that I have been making observations on the presence of *ozone* in the atmosphere, I have repeatedly remarked that its amount was in the direct ratio to the height of the wind. Now if this peculiar element of the atmosphere have the power ascribed to it, of combining with noxious effluvia and rendering them harmless, we can easily imagine that during a *calm* the supply left after the last gale would be speedily exhausted by the constantly rising emanations, which would exercise their baneful influence unchecked: hence the cause of the decline in mortality from cholera and other fevers of its class, during or after a gale of wind, and their fearful havoc whilst a *calm* allows the air to become befouled. May not the almost perpetual calms that obtain in lowest valleys of the earth, be powerful encouragers of the *endemics* which prevail therein? Whilst speaking of *ozone* as a natural disinfectant, I will just allude to the experiments that I have made upon the atmosphere of this neighbourhood, which will fully show how this agent often abounds in the country, when its presence cannot be detected in the next town. I selected four stations: one was nearly in the centre of Bridgewater, the second about three-quarters of a mile from it, the third at Cannington Park, and the fourth at Upland House, both of which stations are about three miles and a quarter from the town. As a specimen of the difference in the amount of ozone at each of these stations, I will take the first week in March 1854.

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* Op. cit. p. 122.

	Actual Amount for 7 days.	Daily Average.	Remarks.
Bridgewater	0·	0·	Hoar frosts and cloudless weather.
Halesleigh	30·	4·2	
Cannington Park .	43·	6·1	Inflammatory diseases among ewes.
Upland House ...	73·	10·3	Frosty. Foggy at end of the week.

The gentleman who kindly took observations for me at Cannington Park, Mr. T. B. Morle, since his attention has been drawn to the presence of ozone in the air, has observed that his cattle suffer severely from inflammatory attacks when this element is brought over his farm in excess by strong equatorial winds. Again, the amount registered by the gardener at Brymore House, about four miles from Bridgewater, from the 11th to 18th of April, 1855, was 48; whilst at the latter station for the same period, I only registered 30. The most remarkable contrast, however, between the observations made in the town and the country, was afforded in March 1854, during the three first weeks of which I only registered at Bridgewater 7· as the actual amount of ozone, whilst Mr. Thomas Clark, at Hasleleigh, Wembdon, whose house is just outside the town, registered 120; and Mr. T. B. Morle, at Cannington Park, 151. I could multiply instances like these, but I think that I have demonstrated the fact sufficiently by those already adduced. The impurity of a town may therefore be roughly guessed at, even through the simple means of an ozone test paper, without the observer wading through its alleys and sniffing at backlets, provided that he is supplied with the amount of ozone in the atmosphere in its near vicinity. Thoroughly, therefore, to investigate this subject in any particular town, the place in question ought to be surrounded by ozone stations, besides having several others in the different streets.

The Properties of Ozone, in some respects, seem to be allied to chlorine: like this gas, it bleaches, is incapable of supporting animal life,—although, so far as we know, it is merely oxygen in an allotropic state, according to Faraday; acts energetically on metals; its smell is like that which follows a powerful electrical discharge, in the laboratory or a thunderstorm; but when concentrated it has somewhat the odour of chlorine.

When it is in excess in the atmosphere, the eyes frequently become affected by its stimulating properties; the pituitary membrane also frequently suffers, and after its prevalence for many days the organs of respiration become affected. Influenza and other pulmonary affections take place, neuralgia and inflammatory diseases among animals, whose powers of resisting morbific influences are small when compared with those possessed by others higher in the scale of creation. The disinfecting property of ozone appears from the statements of Schönbein to be great. This observer states that an atmosphere containing $\frac{1}{6000}$ of this peculiar element is capable of purifying 540 times its volume of air produced from highly putrid meat; that is to say, such a fœtid atmosphere may be neutralised by a quantity of ozone equal to $\frac{1}{3240000}$ of its volume.* The question then arises, how does it effect this most desirable purpose? I will not, however, presume to give an answer, although I may be excused if I draw the student's attention to the conduct of chlorine under similar circumstances, whose disinfecting power probably resides in its affinity for hydrogen, by which it decomposes aqueous vapour, with the hydrogen of which it combines, while the *nascent oxygen* oxidises the organic matter. In what state is this *nascent* oxygen? Is it in the form of *ozone?* If so, it will be remarkable to discover that one disinfectant is capable of developing another from the constituents of the very effluvium which it is intended to conquer; recalling to our mind the poet's image of the struck eagle beholding the fatal dart, that had laid him low, feathered with his own pinion.

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* Dr. Drew, Practical Meteorology, p. 231.

Experiments are not sufficiently numerous to afford data whereon to make a statement that ozone has any specific effect upon the poisons, which, whilst floating in the air, produce cholera, small-pox, erysipelas, and other zymotic diseases. Should it hereafter be shown that it possesses so invaluable a property, its resemblance to chlorine will be lessened, for this gas has been proved to be thoroughly inefficacious, if not actually injurious, in cholera. "At the time," says Dr. Albers,* " that the cholera hospital was filled with clouds of chlorine, then it was that the greatest number of attendants were attacked." The same agent was tried in the Small-pox Hospital some years ago; all offensive smell was overcome as usual, but the power of communicating the disease remained behind.

Ozone is *insoluble* in water,—another point of difference between it and chlorine, which is absorbed by this liquid to the extent of two volumes at 60° under ordinary pressure. Phosphuretted and sulphuretted gases, compounds constantly found in putrid exhalations, are decomposed rapidly by it even at a low temperature. I will conclude these remarks with one more question. Is ozone, when mixed with aqueous vapour, affected like chlorine by light? The reason for my asking this question is the fact that I have, as a general rule, found more ozone developed during the *night* than by *day*. It will be interesting to discover the relation between this agent and other meteorological phenomena, such as the wind, temperature, hygrometric and electric state of the atmosphere, &c., a few observations on which have already been quoted from Dr. Moffat's interesting papers on this subject.

Intimately associated with ozone, is the *Electric Condition of the Atmosphere*, upon which, in its relation to a pestilential state of the season, I shall now make a few remarks. I find from the Meteorological Observations taken at the Royal Observatory during the twenty-two weeks of the cholera epidemic of 1854, that the following are the facts, which are proved by the daily register. The total number of days comprehended within the above period was 154.

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* London Med. Gaz. vol. iii. p. 410; Pereira, Materia Medica, 3d ed. vol. i. p. 371.

Positive electricity was shown in	101	days.
Negative	9	„
Alternately positive and negative	7	„
No electricity shown at all	9	„
Apparatus out of order	28	„
Total	154	„

The real number of observations would, therefore, be 126. During the decline of the cholera, the greatest amount of *negative* electricity was developed especially during the week ending November 18, when this kind was exceedingly strong. The tension of the electricity developed throughout this time was in the average "*moderately strong.*" If we compare the above table with the account of the electricity developed during the first twenty-two weeks of the year, when deaths from cholera were hardly ever registered, a strong contrast will present itself.

Positive electricity was shown in	23	days.
Negative	0	„
No electricity was shown at all	93	„
One thunderstorm	1	„
Apparatus out of order	37	„
	154	„

These are simple facts. So far they only prove that cholera prevailed at a time when the atmosphere was charged almost daily with positive electricity; and that little or no electricity could be discovered by the apparatus during many of the weeks at the commencement of the year, when this disease had not begun to show itself. It must be remembered that these observations were made at Greenwich, where the epidemic raged severely: probably, had the observations been made in the centre of the pestilential cloud, the results would not have been very different.

The High State of the Barometer is another remarkable feature in the history of many epidemics; and as the weight of the atmosphere is so materially influenced by the amount of aqueous vapour, perhaps, as we have been discussing moisture in its connection with the south wind, it will not be out of place to notice what has been observed upon this point, although my space will not admit of my going much into detail.

The high state of the barometer during the prevalence of cholera has been remarked, for instance, by Dr. Prout.* Mr. Hingeston, in several of his papers on the state of the weather during cholera, has also observed a similar rise during the late epidemic. I shall quote Dr. Prout in full. "On a particular day, the 9th of February, 1832, the weight of the air suddenly appeared to rise above the usual standard. As the rise was at the time supposed to be the result of some accidental error, or of some derangement in the apparatus employed; in order to discover its cause, the succeeding observations were made with the most rigid scrutiny: but no error or derangement whatever could be detected. On the days immediately following, the weight of the air still continued above the standard; though not quite so high as on the 9th of February, when the change was first noticed. The air retained its augmented weight during the whole time these experiments were carried on,—namely, about six weeks longer. The increase of the weight of the air observed in these experiments was small, but still decided and real. The method of conducting the experiments was such as not to allow of an error, at least to an amount so great as the additional weight, without the cause of that error having become apparent. There seems, therefore, to be only one mode of rationally explaining this increased weight of the air of London in February 1832; which is, by admitting the diffusion of some gaseous body through the lower regions of the atmosphere of this city, considerably heavier than the air it displaced. About the 9th of February, the wind, which had previously been *west,* veered round to the *east,* and remained chiefly in that quarter to the end of the month. Now, precisely on the change of the wind the first cases of epidemic cholera were reported in London, and from that time the disease continued to spread. That the epidemic cholera was the effect of the peculiar condition of the atmosphere, is more, perhaps, than can be safely maintained; but reasons which have been advanced elsewhere lead the writer of this treatise to believe that the virulent disease termed cholera was owing to the same matter which produced the additional weight of the air. * * * The foreign body, therefore, diffused through the atmosphere of London in February 1832 was probably a variety of malaria." I shall make one or two remarks upon the above statement of Dr. Prout. This gentleman lays much stress upon the *height* of the barometer in February 1832. Daniell, in his Meteorological Essays,* gives an abstract of his observations made at Chiswick from 1826 to 1842 inclusive, whence I derive the following facts:—That the *greatest* height of the barometer in February 1832 was 30·591 inches, or several parts of an inch lower than it was in the years 1827, 1829, and 1840; and that its *mean* height was 30·109, or *higher* than it ever reached during the seventeen years, with the exception of the year 1834: this last fact, coupled with the first, indicates a certain amount of steadiness in the height of the atmosphere. Dr. Prout also remarked that the change in the wind was followed by the appearance of cholera. The reader must compare his statement with that of Professor Daniell, who gives the number of days during the month that each wind prevailed: thus—N. 6, NE. 5,

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* Bridgewater Treatises, viii. p. 353.

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* Vol. ii. pp. 338 to 365.

E. 3, SE. 4, S. 6, SW. 3, W. 1, NW. 1: so that the points from N. by the E. prevailed for *eighteen* days, whilst those from the S. by W. only blew on *eleven*. Mr. Hingeston has observed that the *northerly* wind, with a tendency to the north-east, is conducive to the occurrence of cholera, while, on the contrary, he believes that the *south-west* wind, with plenty of rain, is conducive to healthiness. Connected with the high state of the barometer, is the fact that during February 1832 less rain fell (0·23 inch) than was registered in the same month for all the seventeen years. During the cholera year of 1854, the barometer readings were very high: at Highfield House Observatory, at an elevation of 181 feet, they exceeded the *mean* readings of seven years during the months February, March, April, August, and September, during which last two months the epidemic was at its acme. In March it reached to 30·928 inches. At Greenwich, the mean readings of the barometer for the whole year were in excess (+·082) of the average of thirteen years, and those for the several quarters were also in excess, with the exception of the one including the months October, November, and December,—the quarter in which the cholera continued to subside, and at last disappeared. I have thought it right to place the above scattered facts before the student, not so much for the sake of admitting that any theory can be built upon them, as to draw his attention to what eminent men have observed, which in itself is sufficient to induce him to direct his observations to a point in meteorology, in its relation to disease, of the greatest importance, if not as a practical, at least as a scientific question, the solution of which may prove of the greatest benefit to mankind.

Droughts (Αὐχμῶν δέγενομένων τοὺς ὑπόπροσθεν χρόνους).—Droughts are stated to have prevailed in the year preceding the one under discussion, and it is remarkable that many epidemics have occurred after very dry seasons; for instance, the plague at Constantinople in 1541 succeeded to the *drought* of

1540; and Hecker,* speaking of the plague in China of 1334, writes—"Here a *parching drought*, succeeded by famine, commenced in the tract of country watered by the rivers Kiang and Hoai; and this," he adds, "was followed by such violent torrents of rain in and about Kingsai, that more than 400,000 people perished in the flood." Again, in Tche, after an unexampled *drought*, a plague arose which is said to have carried off 5,000,000 people. The year 1854 was remarkable for its *drought*, the amount of rain that fell at Greenwich being only 18·7 inches, or 7·3 inches less than the average of *thirty-nine* years; at Highfield House, Mr. Lowe† writes:—"The long *drought* of 1854 was another remarkable feature, the deficiency in the amount of rain falling being nearly 12 inches. The amount which fell in February, March, April, June, September, and October, being for the *six* months less than three inches; and in this period, out of 180 days 129 were fine. In March, April, and September, there were 42 cloudless nights, September being particularly free from clouds."

Comets, Meteors, Volcanic Eruptions, and Earthquakes.—Dr. Francis Clifton, in the preface to his edition of the *Epidemics*, &c. of Hippocrates, alludes to a *comet* that is mentioned in Epid. lib. iv. p. 523, ed. Kühn, as being followed by an *earthquake* (ἡλίου χειμερινέων τροπέων ἄστρον οὐ σμικρὸν, πέμπτῃ δὕστερον ἑκαστων σεισμὸς), but we must not suppose that these phenomena, although frequently coincident with epidemical diseases, happened in the pestilential year that we are now studying. Mr. Machin, Professor of Astronomy at Gresham College, and Secretary of the Royal Society, informed Dr. Clifton that there were two *comets* in the days of Hippocrates, and both of them attended by an *earthquake*: the first appeared in the winter solstice, 2nd year of the 88th Olymp., B.C. 427, and therefore in the 33rd year of the age of Hippocrates; and the other, called by Aristotle *ὁ μέγας κομήτης*, also appeared at sunset in winter, and was attended by an *earthquake*, and the inundation of Achaia, 4th year 101st Olymp. B.C. 373, and 87th of Hippocrates's life. I will now proceed to give a few instances wherein the above phenomena were either singly or collectively coincident with certain remarkable *epidemics*.

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* Op. cit. p. 12.

† "Times," Jan. 16, 1854.

On reading the 14th chapter of the book of Zechariah, we find him prophesying that an *earthquake* shall precede the *plague* which he foretold should destroy the enemies of Jerusalem; and, again, in the gospel of the physician St. Luke, will be seen in the 16th chapter and 11th verse: "And great *earthquakes* shall be in divers places, and famines and *pestilences*." When the *plague* broke out, again, at Athens in the winter of the 5th year of the Peloponnesian war,* Thucydides mentions that it was followed in the succeeding spring by earthquakes, which prevented the annual invasion of Attica (*σεισμῶν δὲγενομένων πολλῶν ἀπετρεπάντο πάλιν, καὶ οὐκ ἐγένετο ἐσβολή*, § 89). Dr. Theophilus Thompson, the editor of the *Annals of Influenza*, remarks that *comets* repeatedly attracted attention about the time of catarrhal epidemics, especially near the visitations of 1510, 1557, 1580, 1732, 1737, 1743, and 1762. The 1742-3 comet was the one that frightened the Duke of Modena so much, that he thought running away would lessen his chance of being injured by it, which absurdity was celebrated by an Italian improvisatore thus:—

> "Si al venir vestro i principi sen' vanno,
> Den venga ogni di—durate un anno;"

which Dr. Sam. Johnson thus aptly translated:—

> "If at your coming princes disappear,
> Comets! come every day and stay a year."†

Hecker, in his history of *Epidemics of the Middle Ages*, states that *comets* were seen in 1505 and 1506, and that an *eruption* of Mount Vesuvius took place in 1506, the year of the second visitation of the *sweating sickness* in England:—1505 was also the year of the *petechial fever* of Italy. Coincident with the third visitation of the *sweating sickness* in England, in 1517, there was an *earthquake* felt most seriously at Tubingen, Nordlingen, and Cala, during a violent storm in which 2000 houses and a church were destroyed at Nordlingen: a great *comet* appeared in 1516.* This year, 1517, was also one in which the *Hauptkrankheit* (encephalitis) occurred as an epidemic in the central part of Europe. At the same time there also broke out in Holland an unnamed but dreadful disease, which destroyed many, and was somewhat identical with *pharyngeal croup;* and in the same year the *small-pox* and *measles* were conveyed by Europeans to Hispaniola, and committed dreadful ravages. In the year 1529, 25th July, the *sweating sickness* broke out for the fifth time, and was contemporary with the *Trousse-galant* in France; *comets* appeared, according to Bona,† who relates that a girl actually died of fright upon seeing one. Hecker says, "*comets* appeared in the course of this year in unusual numbers;"‡ one in August 1529, a second in July, and a third (Halley's) in 1531, visible in Europe from the 1st August to October 3rd. This was the one that returned in 1835: its revolutions comprehend between seventy-five and seventy-six years, it having appeared in 1155, 1230, 1305, 1380, 1456, 1531, 1607, 1682, 1758, and 1835, and may be expected again in the year 1910. In the pestilential year of 1854 a *comet* appeared, March 29th, on the border of Pisces, near the star of η Andromedæ. Fearful *earthquakes, fiery meteors,* and *terrestrial commotions* of all descriptions, preceded the plague of 1348. Similar coincidences might be brought forward, but my limits will not admit of the enumeration of more facts bearing upon this part of the subject. How *comets* should influence epidemics is by no means a question likely to be solved yet: the *modus*

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* Thucyd. lib. iii. § 87.

† Boswell, vol. ix. p. 25.

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* Winzerberge, fol. 21, *a* and *b*.

† Bona, p. 143.

‡ Op. cit. p. 248.

operandi, however, of *volcanic eruptions* and *earthquakes* may be easily conceived when we consider what really takes place during their occurrence. Vast volumes of mephitic fumes, impalpable but heavy dust, ashes, cinders, stones, and gases of all descriptions, are vomited from the craters of volcanoes in activity. These deleterious matters get hurled with prodigious force into the higher regions of the atmosphere, where the current rapidly wafts them over distant lands, and thus impregnates the air with an invisible poison, which, as the unseen hand of Providence, fulfils its fatal mission by sapping the health and destroying the life of thousands and tens of thousands. Probably *meteors* or *aerolites* were often mistaken for *comets*: their origin, however, is highly problematical, although they come under the denomination of *foreign bodies* suspended in the atmosphere, and perhaps owe their origin to the same cause that produces what are called "dry fogs," which were noticed in the remarkable year of 1782, when the *influenza* was more widely epidemic than ever it had been before. A *haze* has been observed in cholera districts by many. In 1782 the haze, when seen in a mass, was of a pale blue, possessed drying properties, and had a strong and peculiar odour. About this time, 1783, there was an eruption of Mount Hecla, the most tremendous one on record; it was accompanied by violent wind and rain, and a *darkness* of the heavens; and it was feared that the island would fall to pieces. These fire-spouts broke out on Mount Skapta, which, after rising to a considerable height in the air, formed a torrent of red-hot lava that flowed for six weeks and ran a distance of sixty miles in the sea, in a broken breadth of nearly twelve miles; twelve rivers were dried up; twenty-one villages totally overwhelmed by fire or water, and thirty-four others were materially injured.* In the same year Messina and a number of towns in Italy and Sicily were destroyed: 40,000 persons were killed. In the next year, 1784, Archindschan was annihilated with 12,000 of its inhabitants. Calabria also suffered. The haze was supposed to be connected with the *earthquakes*, and the epidemics with the haze. The dispersion of the haze in the summer of 1783 was attended by a severe thunderstorm. Dr. Prout* regards it as highly probable that some such a mineral as selenium, nearly allied to sulphur and a volcanic product, when combined with hydrogen gas in the form of seleniuretted hydrogen, is capable of producing all the effects which characterise influenza. A bubble of this gas, about the size of a split pea, deprived Berzelius completely of his sense of smell, which was succeeded by a severe catarrh, which remained for fifteen days: at another time he suffered most severely from accidentally inhaling this gas. Now I think with Dr. Prout that it is highly probable that some such a powerful agent does pervade the air after the eruption of volcanoes; and when we know the enormous distance that dust and ashes are propelled, and then carried by the upper currents of air, I see no difficulty in accounting for *some* epidemics by supposing the air in the neighbourhood where they appear to be thus poisoned. Again, we know the effect that any irregularity in the seasons produces on the health of a district. Now it is well known that earthquakes are often ushered in or followed by weather totally different from that which ordinarily prevails over the scene of the catastrophe,—for instance, sudden gusts of wind, made more alarming by an intervening dead calm which makes one listen for something indescribably dreadful which our instinct prompts us to expect: animals participate in our fears, and often, from their greater sensitiveness, are the first to foretell the coming evil by their piteous cries. The sun grows red, and a haziness continues for weeks in the air; the gases that I have alluded to above rise from the ground and taint the atmosphere; torrents of rain, whirlwinds, and water-spouts, in which fish are carried up, add their quotum towards the augmentation of that dread which in such times pervades all the creation. Then comes that fearful moaning thunder-sound striking the citizen with an indescribable panic. The very earth with which they had always associated immobility heaves with the passing wave of the incandescent elements below, striking terror into their hearts, and leaving their over-stretched nerves incapable of performing their full duty; and thus, like panic-stricken soldiers, they allow the citadel of the body to be attacked by a besieging disease without resistance. Humboldt has well described an eruption of Mount Cotopaxi; and living as we do in an age when the *mind,* and its handmaid the nervous system, are taxed to their utmost, it behoves the physician to study well all those phenomena of nature that act upon the psychical nature of man, exciting it, as they do, at one time with fear and at another with hope, whose sequel is always depression. In the Roman history we find thousands of instances of national nervous depression: let my readers peruse the history of their great epidemics—let them again consult the annals of our own wars, and see the effect of a victory or a defeat upon our troops. Whilst they hear the wings of *victory* flap, no fever can conquer them; but let the husky voice of *defeat* jar upon their ears, their energies collapse, and they yield themselves up as easy victims to the diseases of the plain. So it is with earthquakes, and all other sources of dread. A history of volcanic eruptions, earthquakes and their sequels, so far as regards the health of nations, would be a valuable and interesting addition to the literature of our profession. The incandescent bowels of the earth appear to me to be a powerful instrument in the hands of the Almighty, with which he punishes and terrifies his children in order to make them sensible of his wrath and their sinfulness. We know not the effect of an earthquake upon the minds of those who witness this convulsion of nature: we cannot estimate its remote effect upon children that are still in the womb: we know, however, full well the extraordinary consequences, both physical and mental, that succeed to the impressions made on the mind of the mother. May we not infer, therefore, that the effect of the shock of an earthquake has not merely an immediate, but a remote effect upon the people? God ever has been economical of means, but these means have ever been profuse in their effects.

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* Haydn's Dictionary of Dates, p. 304.

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* Op. cit. p. 350.

Pestilential Type.—We find in the account before us of epidemic erysipelas, that most other diseases degenerated into this prevailing one; and this remark is borne out by what has been observed by others. Thucydides, for instance, says of the plague at Athens, "that the year was admitted as the healthiest and most free from other diseases; but if any one had a previous illness it always determined in this alone (εἰδε τις καὶ προέκαμνέ τι, ἐς τοῦτο πάντα ἀπεκρίθη)."* This fact has been long observed and is now undisputed. The remark of Dr. Cormack,† speaking of cholera, "that during the might of the epidemic the choleraic type was impressed on all diseases, or that there was nothing to be seen except choleraic diseases," is pertinent to this subject.

In this sketch many things have been omitted that many would desire to have seen introduced. My apology must be, however, not a want of will to enter more into detail, but rather a desire not to weary (if I have not done so already) my readers. We have seen that Hippocrates's observations were a true and faithful portrait of a year that was remarkable for a ravaging epidemic; and we are now able to judge, from comparison with others, how strong a likeness there is between the group of phenomena that then obtained, and those which have been described by later authors.

* Lib. ii. § 49.

† Ass. Med. Journ. 1853, p. 983.

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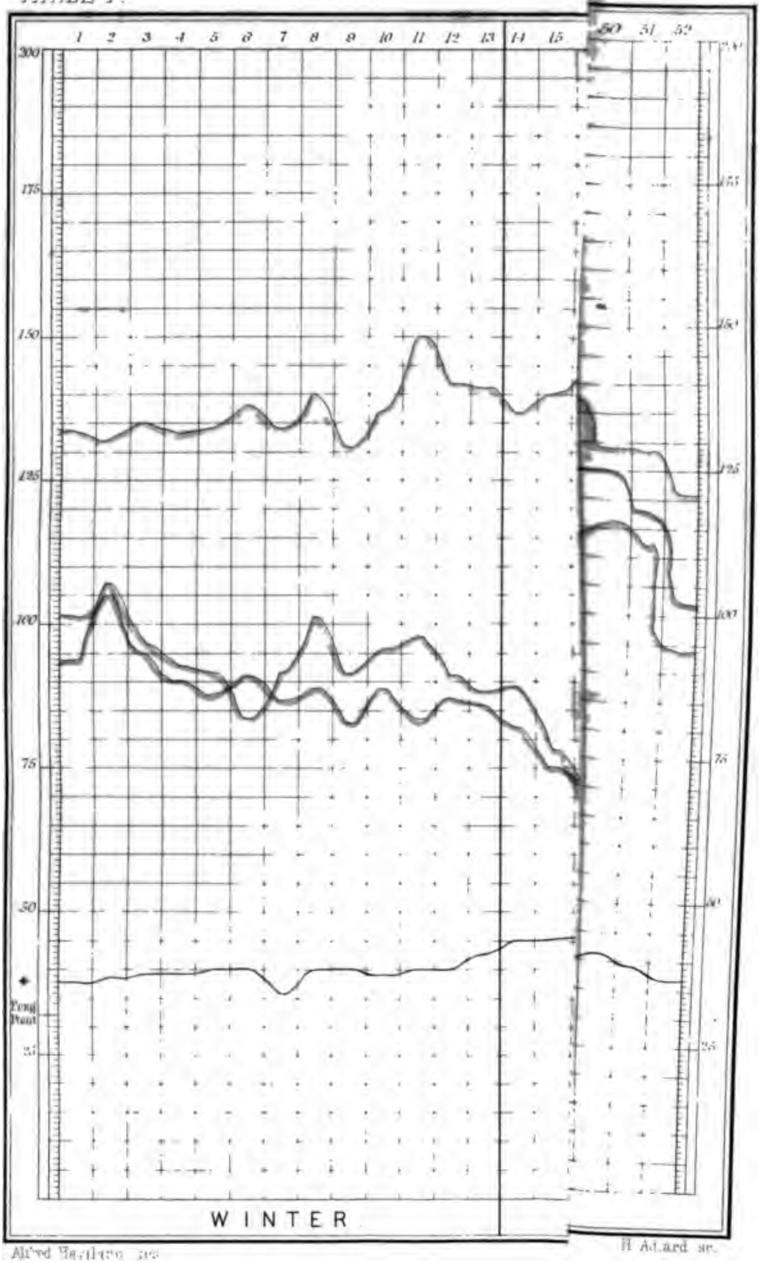

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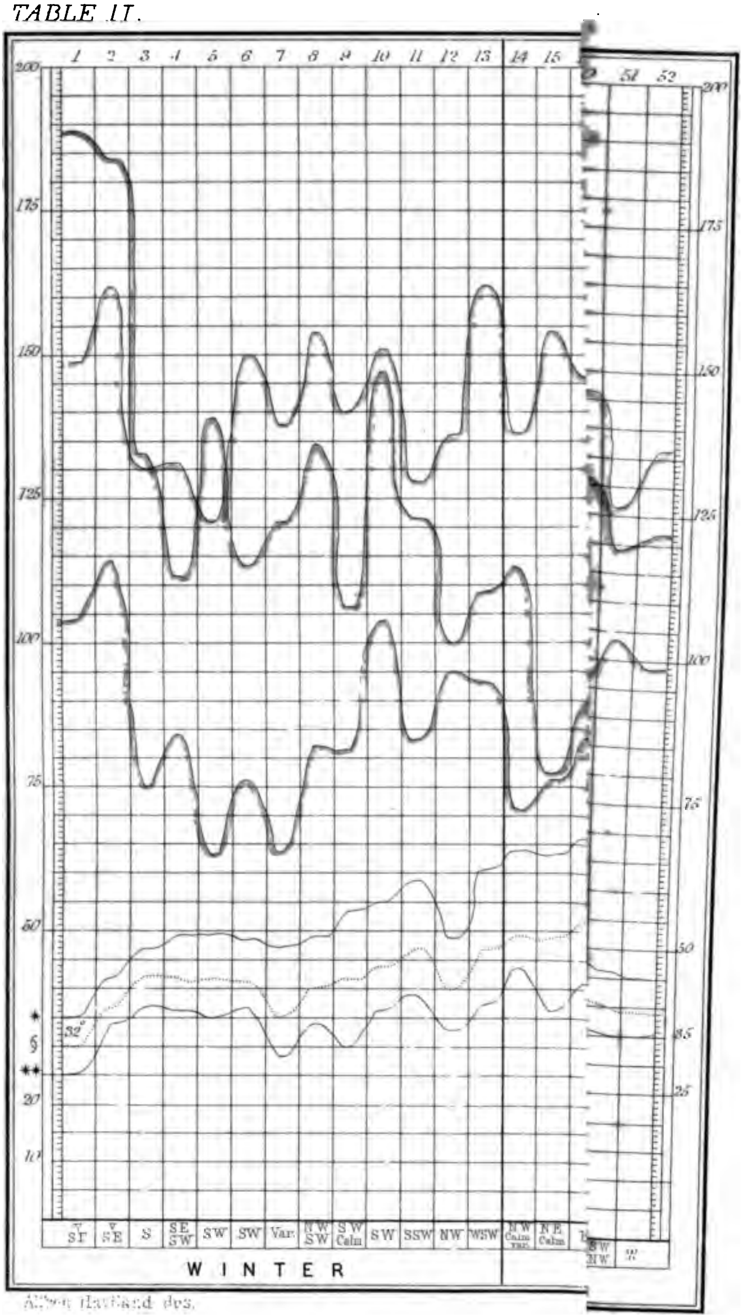

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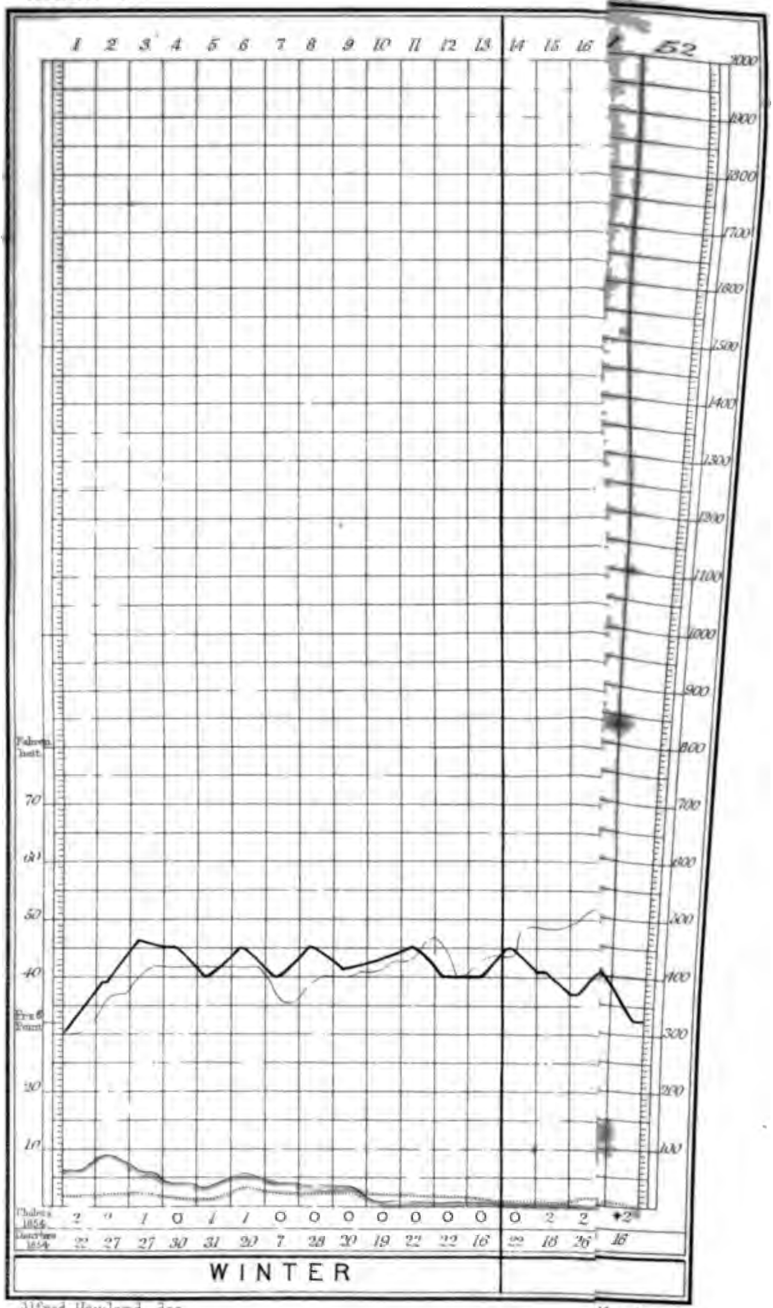

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